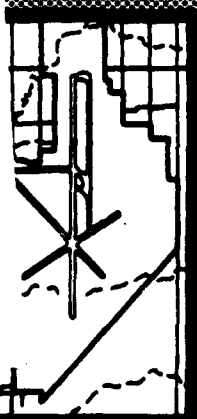


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**INSTALLATION RESTORATION PROGRAM
STAGE 3
McCLELLAN AIR FORCE BASE**

**PREPARED BY:
Radian Corporation
10395 Old Placerville Road
Sacramento, California 95827**

DECEMBER 1988

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**SOLID WASTE
ASSESSMENT TESTING**

FINAL

November 1987 to December 1988

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**United States Air Force
Occupational and Environmental Health Laboratory (USAFOEHL)
Technical Services Division (TS)
Brooks Air Force Base, Texas 78235-5501**

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INSTALLATION RESTORATION PROGRAM
STAGE 3
McCLELLAN AIR FORCE BASE, CALIFORNIA
SOLID WASTE ASSESSMENT TESTING

FINAL

HEADQUARTERS AFLC/DEV
WRIGHT-PATTERSON AFB, OHIO 45433

December 1988

Prepared by:

Radian Corporation
10395 Old Placerville Road
Sacramento, California 95827

USAF Contract No.: F33615-87-D-4023, Delivery Order No.: 0006
Contractor Contract No.: 227-005, Delivery Order No.: 0006
Radian Contract No.: 227-005-06

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REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS N/A		
2a. SECURITY CLASSIFICATION AUTHORITY N/A			3. DISTRIBUTION / AVAILABILITY OF REPORT --		
7b. DECLASSIFICATION / DOWNGRADING SCHEDULE N/A					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) N/A			5. MONITORING ORGANIZATION REPORT NUMBER(S) N/A		
6a. NAME OF PERFORMING ORGANIZATION Radian Corporation		6b. OFFICE SYMBOL (if applicable)		7a. NAME OF MONITORING ORGANIZATION USAFOEHL/TS	
8a. ADDRESS (City, State, and ZIP Code) 10395 Old Placerville Road Sacramento, California 95827			7b. ADDRESS (City, State, and ZIP Code) Brooks AFB, Texas 78235-5501		
9a. NAME OF FUNDING / SPONSORING ORGANIZATION USAFOEHL/TS		8b. OFFICE SYMBOL (if applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER F33615-87-D-4023	
8c. ADDRESS (City, State, and ZIP Code) Brooks AFB, Texas 78235-5501			10. SOURCE OF FUNDING NUMBERS		
PROGRAM ELEMENT NO.		PROJECT NO.		TASK NO.	WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification) Solid Waste Assessment Testing					
12. PERSONAL AUTHOR(S)					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM 11/87 TO 12/88		14. DATE OF REPORT (Year, Month, Day) 88. 12. 30	
15. PAGE COUNT 277					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Soil Gas SAMpling, Vapor Well Sampling, Gas Generation, California Solid Waste Assessment Testing, Landfills, Characterization (K7)		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
<p>This document reports the sampling and analytical results of the gas generation and gas migration testing at 13 inactive landfills, and the vapor wells and gas vents associated with the Area D clay cap remedial action. This report and testing were performed at McClellan AFB in compliance with the California Health and Safety Code Section 41805.5.</p> <p>Keywords: solid waste disposal; pollution;</p>					
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a. NAME OF RESPONSIBLE INDIVIDUAL J.E. Styles, 1st Lt., USAF, BSC			22b. TELEPHONE (Include Area Code) (512) 536-2158		22c. OFFICE SYMBOL USAFOEHL/TS

PREFACE

Radian Corporation is a contractor for the RI/FS program at McClellan AFB, California. This work was performed for the USAF Occupational and Environmental Health Laboratory (USAFOEHL) under USAF Contract No. F33615-87-D-4023, Delivery Order 0006.

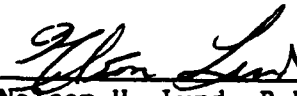
The background sections presented in this technical memorandum were developed for inclusion in the future RI report(s). The sections cover historical activities, as previously presented by other IRP contractors, site features, and contaminant characteristics at McClellan AFB.

Key Radian project personnel were:

Nelson H. Lund, P.E. -- Contract Program Manager
Jack D. Gouge' -- Delivery Order Manager
Morey Lewis, P.E. -- Project Manager
Mark T. Galloway -- Task Leader

The work presented herein was accomplished between January 1988 and December 1988. 1st Lt, J.E. Styles, Technical Services Division, USAFOEHL, was the Technical Program Manager.

Approved:


Nelson H. Lund, P.E.
Contract Program Manager

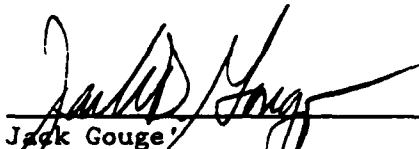

Jack Gouge'
Delivery Order Manager

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1.0 INTRODUCTION

This document reports the results of landfill testing performed at the McClellan Air Force Base (AFB) in compliance with the California Health and Safety Code Section 41805.5. This section requires the testing and preparation of a solid waste assessment report for all active California solid waste sites. McClellan AFB requested Radian Corporation to perform an investigation to evaluate inactive landfills, and Area D perimeter vapor wells and gas vent systems that are associated with the Area D clay cap at McClellan AFB. The testing reported in this document was performed in accordance with the procedures given in the "McClellan AFB Calderon Investigation Draft Quality Assurance Project Plan" (Radian, 1987). This quality assurance project plan (QAPP) was prepared in accordance with the requirements for landfill testing outlined in "Testing Guidelines for Active Solid Waste Disposal Sites" (California Air Resources Board, 1987). The QAPP was approved by a Sacramento County Air Pollution Control Officer and the U.S. Air Force prior to initiation of field testing activities. The testing was specifically designed to determine the gas generation and migration potential of landfills at the base, and to assess the impact, if any, of landfill gas on the atmosphere.

Thirteen inactive landfills were sampled. In addition, nine Area D perimeter soil-gas monitor wells and 14 gas vents located within the Area D cap were sampled. Figure 1-1 shows the approximate locations of these sites.

The landfills were evaluated for landfill gas generation and migration potentials only. No ambient air sampling was performed.

Tracer Research Corporation (TRC), a subcontractor to Radian Corporation, performed the subsurface soil investigation and analytical activities of the testing program.

Section 2.0 of this document presents an overview of the sampling and analytical strategy used during the investigation. Analytical results also are presented. Section 3.0 provides a general description of the

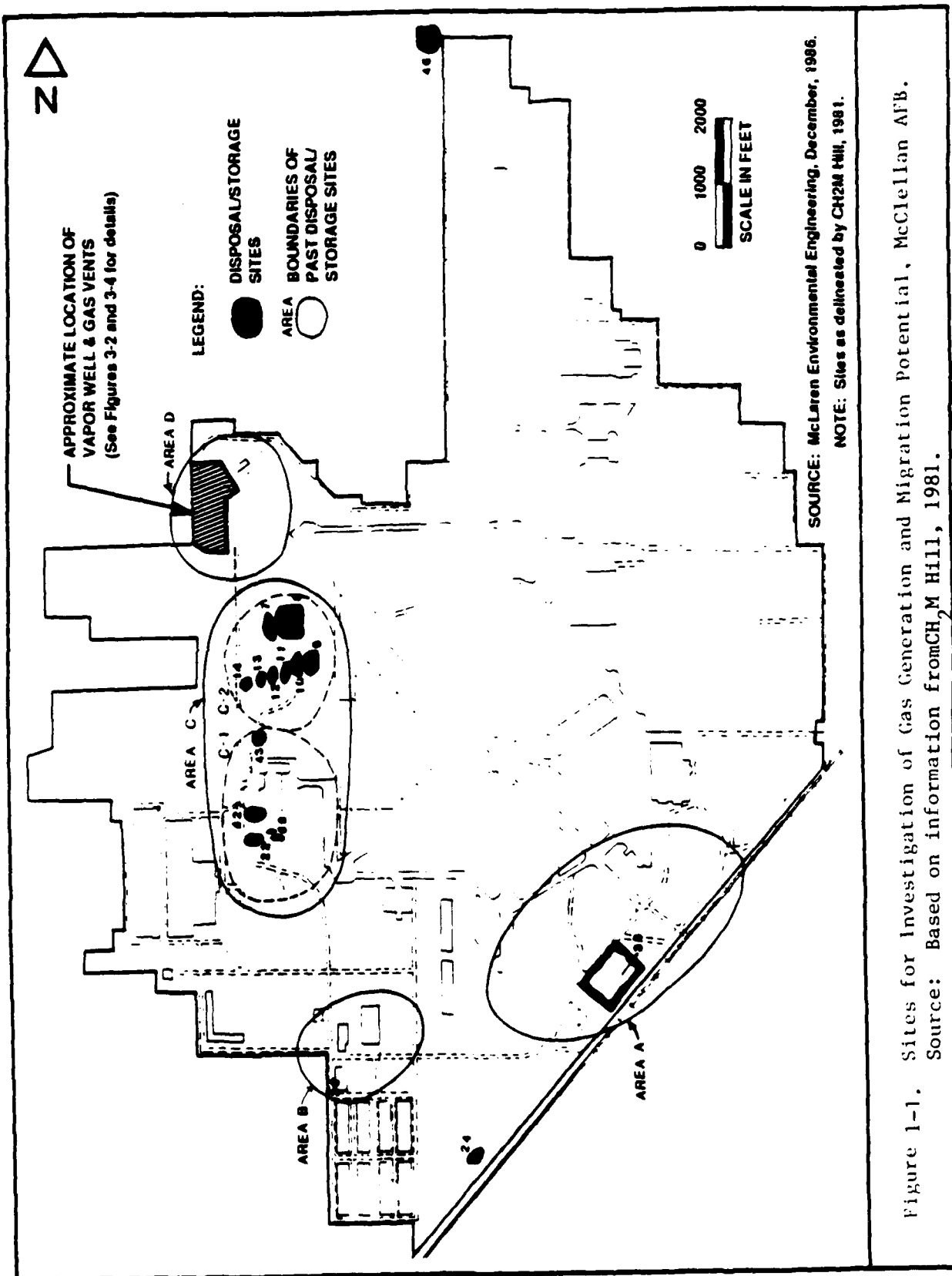


Figure 1-1. Sites for Investigation of Gas Generation and Migration Potential, McClellan AFB.
Source: Based on information from CH₂M Hill, 1981.

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landfill and other test sites that were investigated, and also provides information about the land use and population surrounding McClellan AFB. Section 4.0 presents a more detailed review of the sampling approach, including soil-gas probe installation, sampling procedures, and analytical procedures. Section 5.0 presents a summary of sampling and analytical results. A result summary is presented in Section 5.0 for those sites where sampling detected concentrations of any specified air contaminant compounds above the limit of quantitation. Section 5.0 also discusses the use of the limit of detection and limit of quantitation for data interpretation and briefly discusses quality assurance issues. Section 6.0 briefly discusses the status of remedial actions for each of the landfills and the Area D vapor wells and gas vent system test sites.

Appendix A presents the tabulated analytical results. Appendix B presents the raw analytical data, including quality assurance and quality control samples. Appendix C presents field notes and maps. Appendix D presents site photographs. And Appendix E presents the calculations used to estimate the volumes of air purged for the vapor wells and gas vents.

1.1 Project Description

Field testing at McClellan AFB included the collection of data to satisfy the gas generation and migration compliance requirements of the California Health and Safety Code Section 41805.5 (AB 3375, Calderon, 1984) for the 13 sites.

The field testing was designed to determine:

- The gas generation potential of each of the landfills investigated; and
- The gas migration potential of landfill gas from each of the landfills tested to the respective surrounding areas.

In general, the gas generation potential of each landfill was determined by installing and sampling of up to five ground probes per site to a depth of eight feet. Surface coverings were removed, where possible, to facilitate probe installation. At least one probe was installed in the center of each landfill site, and other probes were installed in other areas of the landfill. The soil-gas samples were analyzed for methane, carbon dioxide, oxygen, nitrogen, and other specified air contaminant compounds which are listed in Table 1-1. These specified air contaminant compounds are based on Attachment 1 of the "Testing Guidelines for Active Solid Waste Disposal Sites" (California State Air Resources Board, 1987).

Gas migration potential was determined by installing and sampling perimeter landfill probes (with a maximum of three probes per landfill site). When appropriate, these perimeter probes were placed between landfills and in the direction of occupied structures. These soil-gas samples were analyzed for methane and the specified air contaminant compounds.

TABLE 1-1. SPECIFIED AIR CONTAMINANT COMPOUNDS ANALYZED IN SOIL-GAS SAMPLES

Compound
Chloroethene (Vinyl Chloride)
Benzene
1,2-Dibromoethane (Ethylene Dibromide)
1,2-Dichloroethane (Ethylene Dichloride)
Dichloromethane (Methylene Chloride)
Tetrachloroethene (Perchloroethylene)
Tetrachloromethane (Carbon Tetrachloride)
1,1,1-Trichloroethane (Methyl Chloroform)
Trichloroethene (Trichloroethylene)
Trichloromethane (Chloroform)

2.0 SUMMARY OF RESULTS

This section presents a brief overview of the sampling and analytical strategy used during the landfill testing and evaluation of the Area D perimeter vapor wells and gas vent system, which is within the Area D clay cap. This section also presents general analytical results of all landfill, soil-gas monitor well, and gas vent testing performed at McClellan Air Force Base (AFB). These results are summarized in Tables 2-1 through 2-15. Maximum values for site-specific analytical results that exceeded the limit of quantitation concentration are presented in Section 5.0. A discussion of the limit of quantitation (LOQ) criteria is presented in Section 5.1.2.

The tests performed included landfill gas characterization and gas migration testing. Ambient air testing for the landfills was not performed as part of the landfill testing program. Landfill gas characterization included screening emissions of the entire disposal area with a portable gas chromatograph containing a flame ionization detector, and landfill gas testing for specified air contaminant compounds (identified in Table 1-1), as well as methane, carbon dioxide, oxygen, and nitrogen at the center of each of the sites. Gas migration testing included landfill gas testing for the specified air contaminant compounds listed in Table 1-1, plus methane, carbon dioxide, oxygen, and nitrogen at perimeter locations at each of the sites.

The analytical procedure for the analysis of soil-gas used was a field gas chromatography technique developed and performed by Tracer Research Corporation of Tucson, Arizona. The technique provides immediate analysis of syringe samples collected directly from subsurface sampling probes after purging two probe volumes prior to sampling. The analytical detection limits and quality assurance activities demonstrated that the technique was sufficient to meet the testing objectives. Limits of detection and quantification were equal to or less than the detection limits for the specified air contaminant compounds identified in the "Testing Guidelines for Active Solid Waste Disposal Sites" (California Air Resources Board, 1987). The limits of detection, limits of quantitation, and analytical results are presented in Section 5.0. Results of tests conducted on landfill sites are discussed below:

TABLE 2-1. ANALYTICAL RESULTS OF SITE NO. 7 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection ^a Limit (ppbv)	Landfill - Sample No.				Perimeter - Sample No.	
		7(1) (ppbv)	7(2) (ppbv)	7(3) (ppbv)	7(4) (ppbv)	7(5) (ppbv)	7(6) (ppbv)
Vinyl Chloride	18	2,000	80	80	2,000	<80	<30
Benzene	13	<2	<10	<10	<10	<20	<10
Ethylene Dibromide	0.12	<5	<0.3	<0.3	<3	<0.4	<0.3
Ethylene Dichloride	18	<20	<20	<20	<200	<50	<20
Methylene Chloride	24	3,000	<30	9,000	5,000	3,000	100
Perchloroethylene	0.14	300	60	40	200	<40	<0.08
Carbon Tetrachloride	0.029	<0.5	<0.03	<0.03	<0.3	<0.08	0.1
Methyl Chloroform	0.17	20	0.8	100	<2	6	0.4
Trichloroethylene	0.17	400	10	40	400	40	1
Chloroform ^b	0.38	<4.0	<0.4	4	4	0.8	0.4
Methane (X) ^b	0.29	3.2	<0.11	<0.21	9.9	<0.11	<0.11
Carbon Dioxide (X) ^b	0.67	1.9	0.63	0.91	3.5	1.1	0.074
Oxygen (X) ^b	1.0	9.4	16	11	1.7	9.4	23
Nitrogen (X) ^b	1.1	67	80	82	43	80	82

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Units are percent (X).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a Landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.		Field ID No.	Depth of Probe	Date	
Reporting ID Number				Sampled	
7(1)	SG8-7L	7.5'		12/04/87	
7(2)	SG9-7L	7'		12/05/87	
7(3)	SG10-7L	6'		12/05/87	
7(4)	SG11-7L	7.5'		12/05/87	
7(5)	SG12-7L	8'		12/05/87	
7(6)	SG13-7P	2'		12/05/87	

TABLE 2-2. ANALYTICAL RESULTS OF SITE NO. 8 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit (ppbv)	Landfill - Sample No.			Perimeter - Sample No.		
		8(2) (ppbv)	8(3) (ppbv)	8(6) (ppbv)	8(7) (ppbv)	8(8) (ppbv)	8(1) (ppbv) 8(4) (ppbv) 8(5) (ppbv)
Vinyl Chloride	18	<10	<30	<80	<20	120,000	<10 <40 <20
Benzene	13	<6	<10	<30	2	2,000	<6 <20 <200
Ethylene Dibromide	0.12	<0.3	<4 ^b	<0.3	<0.05	<3	<0.1 <3 ^b <0.5
Ethylene Dichloride	18	<20 ^b	<800 ^b	<20	<8	<20	<20 ^b <200 ^b <8
Methylene Chloride	24	<30	<900	<30	<10	<300	<20 <300 <10
Perchloroethylene	0.13	1,000	7,000	300	90	600	10 200 40
Carbon Tetrachloride	0.029	<0.05	<0.8	<0.05	<0.01	<0.5	<0.02 <0.5 <0.01
Methyl Chloroform	0.17	400	10,000	9	2	2,000	2 20 9
Trichloroethylene	0.17	400	400	40	8	800	8 20 4
Chloroform ^c	0.38	<0.4	<8	<0.4	<0.1	<4	<0.2 <4 <0.1
Methane (%) ^c	0.29	<0.51	<0.51	<0.54	<0.54	<0.54	<0.51 <0.51 <0.54
Carbon Dioxide (%) ^c	0.67	1.2	1.0	1.2	0.18	1.5	<0.22 0.11 0.07
Oxygen (%) ^c	1.0	11	9.4	10	20	4.2	17 16 16
Nitrogen (%) ^c	1.1	78	78	75	87	80	74 75 78

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Reagent blank did not meet the required detection limit of <20 ppbv on December 10, 1987.

^c Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SGB-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.		Field ID No.	Depth of Probe	Date	
Reporting ID Number				Sampled	
8(1)	SG39-8P	4'		12/10/87	
8(2)	SG39-8I	8'		12/10/87	
8(3)	SG41-8I	8'		12/10/87	
8(4)	SG42-8P	4'		12/10/87	
8(5)	SG43-8P	4'		12/11/87	
8(6)	SG44-8I	8'		12/11/87	
8(7)	SG45-8I	7'		12/11/87	
8(8)	SG46-8I	8'		12/11/87	

TABLE 2-3. ANALYTICAL RESULTS OF SITE NO. 10 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit (ppbv)	Landfill - Sample No.		Perimeter - Sample No.		
				10(1) (ppbv)	10(2) (ppbv)	10(3) (ppbv)
Vinyl Chloride	18	b		<20	<30	<30
Benzene	13	b		<6	<10	<10
Ethylene Dibromide	0.12	b		<0.06	<0.3	<0.3
Ethylene Dichloride	18	b		<10	<20	<20
Methylene Chloride	24	b		<10	<30	<30
Perchloroethylene	0.13	b		0.09	<0.08	<0.08
Carbon Tetrachloride	0.029	b		0.1	<0.03	<0.03
Methyl Chloroform	0.17	b		0.4	<0.2	<0.2
Trichloroethylene	0.17	b		0.4	<0.4	<0.4
Chloroform	0.38	b		<0.2	<0.4	<0.4
Methane (%) ^c	0.29	b		<0.11	<0.11	<0.11
Carbon Dioxide (%) ^c	0.67	b		<0.049	0.12	0.15
Oxygen (%) ^c	1.0	b		23	20	22
Nitrogen (%) ^c	1.1	b		82	78	80

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Field conditions prohibited sample collection.

^c Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample; L = landfill probe, P = perimeter probe.

Sample No.		Field ID No.	Depth of Probe	Date	
Reporting ID Number				Sampled	
10(1)	SG14-10P	4'		12/05/87	
10(2)	SG15-10P	6'		12/05/87	
10(3)	SG16-10P	6'		12/05/87	

TABLE 2-4. ANALYTICAL RESULTS OF SITE NO. 11 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection ^a Limit (ppbv)	Landfill - Sample No.		Perimeter - Sample No.	
		11(1)	11(2)	11(1)	11(2)
		(ppbv)	(ppbv)	(ppbv)	(ppbv)
Vinyl Chloride	18	b	b	<20	<30
Benzene	13	b	b	<6	<10
Ethylene Dibromide	0.12	b	b	<0.06	<0.1
Ethylene Dichloride	18	b	b	<10	<20
Methylene Chloride	24	b	b	<10	<20
Perchloroethylene	0.14	b	b	<0.03	3
Carbon Tetrachloride	0.029	b	b	<0.02	<0.02
Methyl Chloroform	0.17	b	b	<0.08	0.6
Trichloroethylene	0.17	b	b	<0.2	4
Chloroform ^c	0.38	b	b	<0.2	<0.2
Methane (%) ^c	0.29	b	b	<0.11	2.6
Carbon Dioxide (%) ^c	0.67	b	b	0.97	0.63
Oxygen (%) ^c	1.0	b	b	11	1.9
Nitrogen (%) ^c	1.1	b	b	85	84

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Field conditions prohibited sample collection.

^c Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.			
Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
11(1)	SG17-11P	6'	12/05/87
11(2)	SG26-11P	2'	12/07/87

TABLE 2-5. ANALYTICAL RESULTS OF SITE NO. 12 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit (ppbv)	Landfill - Sample No.	Perimeter - Sample No.			
			12(1) (ppbv)	12(2) (ppbv)	12(3) (ppbv)	12(4) (ppbv)
Vinyl Chloride	18	b	<30	56,000	52,000	22,000
Benzene	13	b	100	32,000	<600	1,000
Ethylene Dibromide	0.12	b	<0.1	<4	<3	<0.06
Ethylene Dichloride	18	b	<20	<500	<200	<8
Methylene Chloride	24	b	<20	<600	1,000	1,000
Perchloroethylene	0.14	b	3	4,000	4,000	100
Carbon Tetrachloride	0.029	b	<0.02	60	10	<0.02
Methyl Chloroform	0.17	b	4	<4	80	2
Trichloroethylene	0.17	b	4	8,000	5,000	200
Chloroform ^c	0.38	b	<0.2	2,000	40	1
Methane (%) ^c	0.29	b	<0.46	3.7	1.9	4.5
Carbon Dioxide (%) ^c	0.67	b	0.29	1.3	1.2	0.32
Oxygen (%) ^c	1.0	b	17	3.0	4.4	6.1
Nitrogen (%) ^c	1.1	b	85	80	65	62

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Field conditions prohibited sample collection.

^c Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.		Field ID No.	Depth of Probe	Date Sampled
Reporting ID Number				
12(1)	SG24-12P	5'		12/07/87
12(2)	SG25-12P	5'		12/07/87
12(3)	SG64-12P	6'		12/15/87
12(4)	SG65-12P	5'		12/15/87

TABLE 2-6. ANALYTICAL RESULTS OF SITE NO. 13 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection ^a Limit (ppbv)	Landfill - Sample No.		Perimeter - Sample No.	
		13(2)	(ppbv)	13(1)	(ppbv)
Vinyl Chloride	18	<30		<20	5,000
Benzene	13	<200		<60	600
Ethylene Dibromide	0.12	<0.2		<0.1	<0.2
Ethylene Dichloride	18	<20		<10	<20
Methylene Chloride	24	<30		<10	200
Perchloroethylene	0.14	0.2		4	6
Carbon Tetrachloride	0.029	<0.05		<0.02	<0.05
Methyl Chloroform	0.17	0.4		0.8	4
Trichloroethylene	0.17	1		4	40
Chloroform ^b	0.38	<0.4		<0.2	<0.4
Methane (%) ^b	0.29	<0.21		<0.21	7.4
Carbon Dioxide (%) ^b	0.67	0.2		0.91	2.8
Oxygen (%) ^b	1.0	19		9.4	4.8
Nitrogen (%) ^b	1.1	84		87	55

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.			
Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
13(1)	SG5-13P	5'	12/04/87
13(2)	SG6-13L	5'	12/04/87
13(3)	SG7-13P	5'	12/04/87

TABLE 2-7. ANALYTICAL RESULTS OF SITE NO. 14 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection ^a Limit (ppbv)	Landfill - Sample No.		Perimeter - Sample No.		
		14(2) (ppbv)	14(3) (ppbv)	14(1) (ppbv)	14(4) (ppbv)	14(5) (ppbv)
Vinyl Chloride	18	<10	<20	<10	<20	<20
Benzene	13	<10	<1	<10	<60	<60
Ethylene Dibromide	0.12	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylene Dichloride	18	<20	<20	<20	<10	<10
Methylene Chloride	24	<30	100	<30	<10	<10
Perchloroethylene	0.14	<0.2	10	0.2	0.1	0.4
Carbon Tetrachloride	0.029	0.05	<0.02	0.06	0.1	<0.02
Methyl Chloroform	0.17	<0.2	4	<0.2	0.4	0.8
Trichloroethylene	0.17	<0.4	2	<0.4	<0.2	<0.2
Chloroform ^b	0.38	<0.4	40	<0.4	<0.2	<0.2
Methane (X) ^b	0.29	<0.51	<0.42	<0.51	<0.21	<2.1
Carbon Dioxide (X) ^b	0.67	<2.1	5.3	<2.1	<0.091	0.22
Oxygen (X) ^b	1.0	12	17	14	22	20
Nitrogen (X) ^b	1.1	70	82	75	84	84

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Units are percent (X).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.		Field ID No.	Depth of Probe	Date	
Reporting ID Number	Sampled			Sampled	
14(1)	SG1-14P	6'	12/02/87		
14(2)	SG2-14L	5.5'	12/02/87		
14(3)	SG28-14L	8'	12/03/87		
14(4)	SG3-14P	5.25'	12/04/87		
14(5)	SG4-14P	5.5'	12/04/87		

TABLE 2-8. ANALYTICAL RESULTS OF SITE NO. 22 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection ^a Limit (ppbv)	Landfill - Sample No.			Perimeter - Sample No.	
		22(1) (ppbv)	22(2) (ppbv)	22(3) (ppbv)	22(4) (ppbv)	22(5) (ppbv)
Vinyl Chloride	18	<10	<10	<30	4,000	<10
Benzene	13	<6	<6	<10	1	<6
Ethylene Dibromide	0.12	<0.1 _b	<0.1 _b	<0.3 _b	<0.3 _b	<0.1 _b
Ethylene Dichloride	18	<20	<20	<20	<20	<20
Methylene Chloride	24	<20	<20	<30	<30	<20
Perchloroethylene	0.14	<0.04	30	3	3	6
Carbon Tetrachloride	0.029	<0.02	<0.02	<0.05	<0.05	<0.02
Methyl Chloroform	0.17	4	4	2	<0.2	8
Trichloroethylene	0.17	40	10	4	400	400
Chloroform ^c	0.38	<0.2	<0.2	<0.4	<0.4	<0.2
Methane (%) ^c	0.29	<0.51	<0.51	<0.51	<0.51	<0.51
Carbon Dioxide (%) ^c	0.67	1.1	0.91	0.18	0.17	0.055
Oxygen (%) ^c	1.0	7.2	7.5	6.9	4.5	15
Nitrogen (%) ^c	1.1	79	80	84	85	68

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Reagent blank did not meet the required detection limit of ≤20 ppbv on December 10, 1987.

^c Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.	Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
22(1)	SG34-22L	7'	7'	12/10/87
22(2)	SG35-22L	8'	8'	12/10/87
22(3)	SG36-22L	7'	7'	12/10/87
22(4)	SG37-22P	5'	5'	12/10/87
22(5)	SG38-22L	8'	8'	12/10/87

TABLE 2-9. ANALYTICAL RESULTS OF SITE NO. 24 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection ^a Limit (ppbv)	Landfill - Sample No.			Perimeter - Sample No.		
		24(3) (ppbv)	24(4) (ppbv)	24(5) (ppbv)	24(6) (ppbv)	24(1) (ppbv)	24(2) (ppbv)
Vinyl Chloride	18	<20	<20	<20	<20	<20	<20
Benzene	13	10	10	10	10	10	10
Ethylene Dibromide	0.12	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylene Dichloride	18	<10	<10	<10	<10	<10	<10
Methylene Chloride	24	<20	<20	<20	<20	<20	<20
Perchloroethylene	0.14	<0.04	<0.04	3	<0.04	2	4
Carbon Tetrachloride	0.029	<0.02	<0.02	<0.02	<0.02	<0.02	0.2
Methyl Chloroform	0.17	10	0.8	200	2	2	0.8
Trichloroethylene	0.17	80	8	40	4	20	20
Chloroform ^c	0.38	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methane (%) ^c	0.29	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58
Carbon Dioxide (%) ^c	0.67	0.068	<0.27	1.2	0.27	<0.27	<0.27
Oxygen (%) ^c	1.0	18	18	6.9	20	19	19
Nitrogen (%) ^c	1.1	71	69	76	73	75	73

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.	Reporting	Field	Depth of	Date
ID Number	ID No.	Probe	Sampled	
24(1)	SG58-24P	2'	12/14/87	
24(2)	SG59-24P	3'	12/14/87	
24(3)	SG60-24L	8'	12/14/87	
24(4)	SG61-24L	8'	12/14/87	
24(5)	SG62-24L	8'	12/14/87	
24(6)	SG63-24L	3'	12/14/87	

TABLE 2-10. ANALYTICAL RESULTS OF SITE NO. 38 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection ^a Limit (ppbv)	Landfill - Sample No.			Perimeter - Sample No.		
		38(1) (ppbv)	38(2) (ppbv)	38(3) (ppbv)	38(4) (ppbv)	38(5) (ppbv)	38(6) (ppbv)
Vinyl Chloride	18	<20	<200	<200	<20	b	b
Benzene	13	<6	<60	<60	<20	b	b
Ethylene Dibromide	0.12	<0.05	<0.5	<0.5	<0.05	b	b
Ethylene Dichloride	18	<8	<80	<80	<8	b	b
Methylene Chloride	24	<10	<100	<100	<10	b	b
Perchloroethylene	0.14	300	90	90	<0.02	b	b
Carbon Tetrachloride	0.029	<0.01	8	<0.1	<0.01	b	b
Methyl Chloroform	0.17	10	100	6	0.8	b	b
Trichloroethylene	0.17	20	100	10	4	b	b
Chloroform ^c	0.38	<0.1	<1	<1	<0.1	b	b
Methane (%) ^c	0.29	<0.54	<0.54	<0.54	<0.54	b	b
Carbon Dioxide (%) ^c	0.67	0.57	<0.13	<0.14	0.25	b	b
Oxygen (%) ^c	1.0	8.6	17	17	20	b	b
Nitrogen (%) ^c	1.1	85	80	84	84	b	b

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Field conditions prohibited sample collection.

^c Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.		Field ID No.	Depth of Probe	Date Sampled
Reporting ID Number				
38(1)	SG54-38L	6'		12/11/87
38(2)	SG55-38L	4'		12/11/87
38(3)	SG56-38L	4'		12/11/87
38(4)	SG57-38L	2'		12/11/87
38(5)	(No sample) = water at 3'			
38(6)	" "	"	"	"

TABLE 2-11. ANALYTICAL RESULTS OF SITE NO. 42 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit (ppbv)	Landfill - Sample No.					Perimeter - Sample No.	
		42(1) (ppbv)	42(2) (ppbv)	42(3) (ppbv)	42(4) (ppbv)	42(5) (ppbv)	42(1) (ppbv)	42(2) (ppbv)
Vinyl Chloride	18	<200	<20	<200	<20	<20	b	b
Benzene	13	<60	<6	<60	<6	<6	b	b
Ethylene Dibromide	0.12	<0.5	<0.05	<0.5	<0.05	<0.05	b	b
Ethylene Dichloride	18	<80	<8	<80	<8	<8	b	b
Methylene Chloride	24	<100	<10	<100	<10	<10	b	b
Perchloroethylene	0.14	30	3	20	3	6	b	b
Carbon Tetrachloride	0.029	<0.1	<0.01	<0.1	<0.01	<0.01	b	b
Methyl Chloroform	0.17	200	2	40	10	0.4	b	b
Trichloroethylene	0.17	200	80	3,000	40	4	b	b
Chloroform	0.38	<1	<0.1	<1	<0.1	<0.1	b	b
Methane (%) ^c	0.29	<0.54	<0.54	<0.54	<0.54	<0.54	b	b
Carbon Dioxide (%) ^c	0.67	1.0	0.63	0.35	0.68	<0.25	b	b
Oxygen (%) ^c	1.0	18	15	19	17	12	b	b
Nitrogen (%) ^c	1.1	87	89	87	84	78	b	b

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Field conditions prohibited sample collection.

^c Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.		Field ID No.	Depth of Probe	Date	
Reporting ID Number				Sampled	
42(1)		SG47-42L	4'	12/11/87	
42(2)		SG48-42L	4'	12/11/87	
42(3)		SG49-42L	3'	12/11/87	
42(4)		SG50-42L	6'	12/11/87	

TABLE 2-12. ANALYTICAL RESULTS OF SITE NO. 43 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection ^a		Landfill - Sample No.		Perimeter - Sample No.	
	Limit (ppbv)	43(2) (ppbv)	43(4) (ppbv)	43(6) (ppbv)	43(1) (ppbv)	43(5) (ppbv)
Vinyl Chloride	18	<30	<30	<30	<30	<30
Benzene	13	<10	600	<10	30	<10
Ethylene Dibromide	0.12	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylene Dichloride	18	<20	<20	<20	<20	<20
Methylene Chloride	24	<20	<20	<20	<20	<20
Perchloroethylene	0.14	1	<0.04	0.6	1	<0.04
Carbon Tetrachloride	0.029	<0.06	0.1	<0.02	<0.05	<0.03
Methyl Chloroform	0.17	0.2	0.4	<0.8	0.2	0.4
Trichloroethylene	0.17	2	2	4	1	1
Chloroform ^b	0.38	<0.2	<0.2	<0.2	<0.2	<0.2
Methane (%) ^b	0.29	<0.46	<0.46	<0.46	<0.46	<0.46
Carbon Dioxide (%) ^b	0.67	0.68	0.21	0.057	0.21	0.08
Oxygen (%) ^b	1.0	16	13	20	19	16
Nitrogen (%) ^b	1.1	89	44	87	89	66

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.		Field ID No.	Depth of Probe	Date	
Reporting ID Number				Sampled	
43(1)	SG18-43P	5.5'		12/07/87	
43(2)	SG19-43L	7'		12/07/87	
43(3)	SG20-43P	7'		12/07/87	
43(4)	SG21-43L	7'		12/07/87	
43(5)	SG22-43P	4'		12/07/87	
43(6)	SG23-43L	4'		12/07/87	

TABLE 2-13. ANALYTICAL RESULTS OF SITE NO. 69 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection ^a		Landfill - Sample No.					Perimeter - Sample No.	
	Limit (ppbv)		69(1) (ppbv)	69(3) (ppbv)	69(4) (ppbv)	69(5) (ppbv)	69(6) (ppbv)	69(7) (ppbv)	69(8) (ppbv)
Vinyl Chloride	18		<20	400	<20	<20	<20	<20	<10
Benzene	13		<10	1,000	<10	<10	<10	<10	<6
Ethylene Dibromide	0.12		<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylene Dichloride	18		<20	<50	<20	<20	<20	<20	<20
Methylene Chloride	24		<20	<60	<20	<20	<20	<20	<20
Perchloroethylene	0.14		<0.06	<0.1	4	3	<0.06	<0.06	<0.04
Carbon Tetrachloride	0.029		<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.02
Methyl Chloroform	0.17		1	1	2	4	1	1	4
Trichloroethylene	0.17		4	8	40	20	6	4	6
Chloroform ^b	0.38		<0.4	<0.6	<0.4	<0.4	<0.4	<0.4	<0.2
Methane (%) ^b	0.29		<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.51
Carbon Dioxide (%) ^b	0.67		<0.25	1.2	0.57	0.41	0.97	1.9	0.11
Oxygen (%) ^b	1.0		20	5.8	14	16	7.8	19	16
Nitrogen (%) ^b	1.1		84	85	77	77	87	82	78

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No.		Field ID No.	Depth of Probe	Date	
Reporting ID Number				Sampled	
69(1)	SG27-69L	7'		12/09/87	
69(2)	SG28-69P	5'		12/09/87	
69(3)	SG29-69L	8'		12/09/87	
69(4)	SG30A-69L	8'		12/09/87	
69(5)	SG30B-69L	8'		12/09/87	
69(6)	SG31-69L	8'		12/09/87	
69(7)	SG32-69L	8'		12/09/87	
69(8)	SG33-69P	3'		12/10/87	

TABLE 2-15. ANALYTICAL RESULTS OF THE AREA D GAS VENT COLLECTION SYSTEM TESTS

Compound	Detection Limit	Gas Vent - Sample No.													
		VC1-3 [ppbv]	VC-MS.1 [ppbv]	VC2.3 [ppbv]	VC2.7 [ppbv]	VC3.1 [ppbv]	VC3.5 [ppbv]	VC3.7 [ppbv]	VC3.9 [ppbv]	VC4.1 [ppbv]	VC4.2 [ppbv]	VC4.4 [ppbv]	VC6.1 [ppbv]	VC6.2 [ppbv]	VC6.3 [ppbv]
Vinyl Chloride	18	<20	<30	<20	<20	<40	<40	<30	<100	<40	<20	<20	<200	<200	<200
Benzene	13	10	<10	<10	<6	<30	<20	<10	<50	<30	<10	<10	100	100	100
Ethylene Dibromide	0.12	<0.08	<0.06	<0.1	<0.05	<0.4	<0.3	<0.1	<0.4	<0.4	<0.1	<0.1	<0.8	<0.8	<0.8
Ethylene Dichloride	18	<10	<8	<20	<8	<50	<50	<20	<50	<50	<20	<20	<100	<100	<100
Methylene Chloride	24	<20	<9	<20	<10	<50	<50	<20	<50	<50	<20	<20	<200	<200	<200
Perchloroethylene	0.14	<0.04	0.9	<0.06	<0.6	<0.1	<0.1	<0.1	0.2	<0.102	<0.06	<0.06	9	<0.4	<0.4
Carbon Tetrachloride	0.029	<0.02	<0.02	<0.03	<0.01	<0.06	<0.06	<0.02	<0.08	<0.06	<0.03	<0.03	<0.2	<0.2	<0.2
Methyl Chloroform	0.17	2	20	200	2,000	200	80	6	20	20	20	<0.1	2,000	1,000	400
Trichloroethylene	0.17	4	9	20	2,000	10	20	1	4	<0.6	<0.2	<0.2	80	40	40
Chloroform	0.38	<0.2	<0.2	<0.4	<0.1	<0.6	<0.6	<0.2	<0.8	<0.6	<0.4	<0.4	<2	<2	<2
Methane (%) ^b	0.29	<0.58	<0.63	<0.58	<0.54	<0.58	<0.54	<0.46	<0.46	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58
Carbon Dioxide (%) ^b	0.67	0.097	1.0	0.57	0.25	1.1	0.63	0.16	0.34	0.4	0.47	0.16	0.34	0.44	0.47
Oxygen (%) ^b	1.0	19	3.2	16	17	7.8	14	20	19	16	16	19	17	17	15
Nitrogen (%) ^b	1.1	72	75	79	73	84	8.2	85	82	79	81	80	77	77	75

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Units are percent (%).

Analytical results for the gas vents located throughout the Area D clay cap area are identified by the same sample as reporting and field identification numbers. The range numbers can be used to review the analytical results in Appendix A and the raw analytical results in Appendix B. The "VC" designation in the sample number corresponds to a "vent cap" on gas vent samples.

TABLE 2-14. ANALYTICAL RESULTS OF THE AREA D SOIL-GAS MONITOR WELLS TESTS

Compound	Detection Limit	Vapor Monitor Wells - Sample No.								
		VU-1 (ppbv)	VU-2 (ppbv)	VU-3 (ppbv)	VU-4 (ppbv)	VU-5 (ppbv)	VU-6 (ppbv)	VU-7 (ppbv)	VU-8 (ppbv)	VU-9 (ppbv)
Vinyl Chloride	18	<300	<400	<40	<30	<300	<30	<300	<300	<300
Benzene	13	<100	<200	<20	<10	<100	<10	<100	<100	<100
Ethylene Dibromide	0.12	<1	<3	<0.3	<0.06	<0.6	<0.06	<0.6	<0.6	<0.6
Ethylene Dichloride	18	<200	200	<6	<8	<80	<8	<80	<80	<80
Methylene Chloride	24	<20	<300	<30	<9	<90	<9	<90	<90	<90
Perchloroethylene	0.14	<0.4	<0.9	<0.09	2	<0.3	<0.03	90	30	20
Carbon Tetrachloride	0.029	3	30	10	<0.02	<0.2	<0.02	<0.2	<0.2	<0.2
Methyl Chloroform	0.17	<0.8	<2	<0.2	1	8	10	800	900	80
Trichloroethylene	0.17	<2	80	10	600	800	100	6,000	1,000	100
Chloroform ^b	0.38	<2	<4	<0.4	<0.2	<2	<0.2	<2	<2	<2
Methane (%) ^b	0.29	<0.46	<0.46	<0.46	<0.53	<0.53	<0.53	<0.53	<0.53	<0.53
Carbon Dioxide (%) ^b	0.67	<0.21	0.054	0.091	0.22	0.63	0.19	0.5	0.41	0.35
Oxygen (%) ^b	1.0	20	20	20	11	11	11	2.8	6.6	9.4
Nitrogen (%) ^b	1.1	84	87	87	76	75	69	77	78	76

^a Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

^b Units are percent (%).

Analytical results for the soil-gas monitor wells are identified by the same sample reporting and field identification numbers. These sample numbers can be used to review the analytical results in Appendix A and the raw analytical results in Appendix B. The "VU" designation in the sample number corresponds to a vapor well sample.

- The emission screening survey using the organic vapor analyzer (OVA) did not detect landfill gases within three inches of the landfill surface at concentrations exceeding the background level of 3.5 ppmv total hydrocarbons calibrated as methane in air for any of the landfills tested or at the clay cap in Area D.
- Landfill gas testing detected some specified air contaminant compounds above the laboratory limit of quantitation. See Section 5.2 for further detail.
- Gas migration testing for the inactive landfill sites detected some specified air contaminant compounds above the limit of quantitation. Gas migration testing of the sites within the Area D cap was performed by sampling the 9 vapor wells and 14 on-site gas vents. See Section 5.3 for further detail.

3.0 DISPOSAL SITES DESCRIPTION

This section presents a general description of each of the disposal sites tested and the provides a general discussion of the land use in the areas within and adjacent to the McClellan Air Force Base (AFB). Figure 3-1 shows the locations of landfill sites and Area D where soil-gas testing was performed. Sites 7, 8, 10, 11, 12, 13, 14, 22, 42, 43, and 69 are within Area C designated in Figure 3-1. Site 38 is within Area A, Site 24 is within the designated Other Area, and the vapor wells and gas vents are within Area D. Individual site descriptions, maps, and sampling results are presented for each of the sites in Section 5.0. Table 3-1 presents a summary of the site names, descriptions, and dimensions.

3.1 Area D Vapor Monitor Well Sites and Gas Collection System

Two of the 13 sites tested are located within and adjacent to the Area D clay capped area. These vapor monitor wells and gas vents were constructed as part of a remedial action for Area D of McClellan AFB. Nine vapor monitor wells and 14 gas vents were sampled under this testing program. The locations of these vapor wells are presented in Figure 3-2. A schematic diagram of the Area D vapor well completion is presented in Figure 3-3. The locations of the Area D gas vent sampling are shown in Figure 3-4. Figure 3-4 also illustrates the pathway traveled during the site emission survey for Area D. Similar information is provided for the other sites in Appendix C.

3.2 Surrounding Land Use

3.2.1 Population

McClellan AFB is surrounded by three tract communities in Sacramento County. The communities surrounding the base include Rio Linda and Elverta to the northwest, North Sacramento to the west and southwest, and North Highlands to the east. All of these communities are. Rio Linda and North Highlands are unincorporated areas.

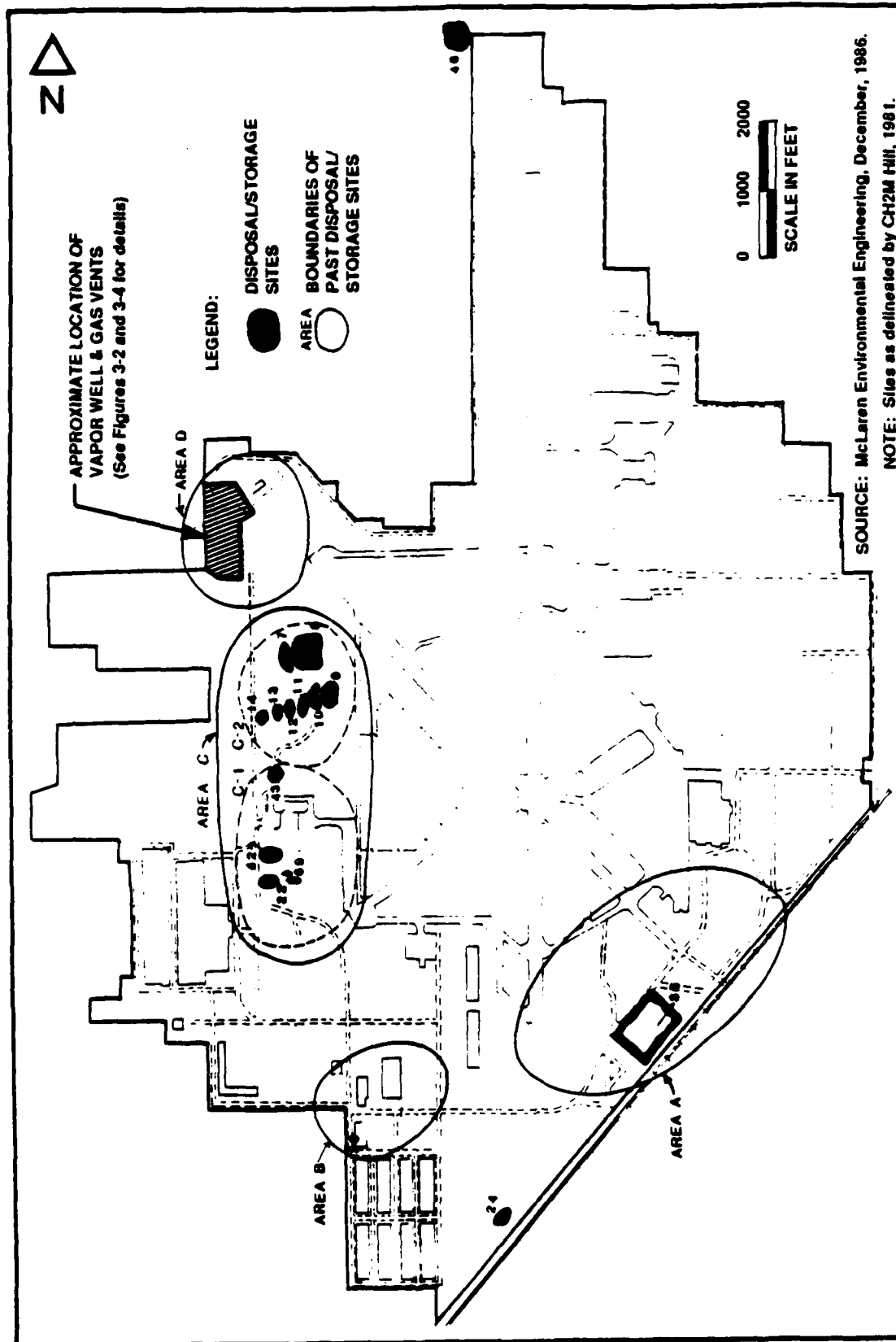


Figure 3-1. Sites for Investigation of Gas Generation and Migration Potential, McClellan AFB.
Source: Based on information from CH₂M Hill, 1981.

0188-017-1

TABLE 3-1. INVESTIGATED SITES FOR GAS GENERATION AND MIGRATION POTENTIAL AT MCCLELLAN AFB

Site	Area	Description	Location	Dimensions (ft)	Identified Contaminants ^a
7	C	Southludge/Oil Pit	East of Building 701	380 x 93 x 23	PP/OG/PCB
8	C	Southludge & Refuse Landfill	600 ft northwest of Building 774	435 x 135 x 20	VOC/BM
10	C	Landfill	500 ft west of Building 774	530 x 100 x 15	PP/PCB
11	C	Landfill	600 ft west of Building 774	405 x 80 x 6	PP
12	C	Landfill	900 ft southwest of Building 774	610 x 90 x 12	PP
13	C	Landfill	1,000 ft west of Building 774	600 x 90 x 15	PP
14	C	Landfill	Near Patrol Road, 300 ft south of Building 701	600 x 90 x 14	PP
22	C	Burn Pit & Landfill	South of IWTP Aeration Basin	400 x 100	PP/PCB/OG
24	Other	Landfill	East of Building 621	515 x 80 x 11	PP
38	A	Underground Tanks/Sludge Landfill	Building 475	600 x 400	VOC/BM
42	C	Oil Southstorage/Landfill	Under IWTP Aeration Basin	210 x 50 x 6	PP/OG/PCB
43	C	Landfill	Northwest of Building 704	405 x 50 x 10	PP
69	C	Burn Pit	SouthEast of Building 704	N/A	PP
N/A	D	Area D Vapor Wells	Perimeter of Area D	N/A	N/A
N/A	D	Area D Gas Vent System	Perimeter & Interior of Area D	N/A	N/A

^a Key to identified contaminants:

BM = Base/neutral priority pollutants

PCB = Polychlorinated biphenyls

VOC = Volatile organic compounds

OG = Oil and grease

PP = Priority pollutants

IWTP = Industrial Wastewater Treatment Plant

N/A = Not available

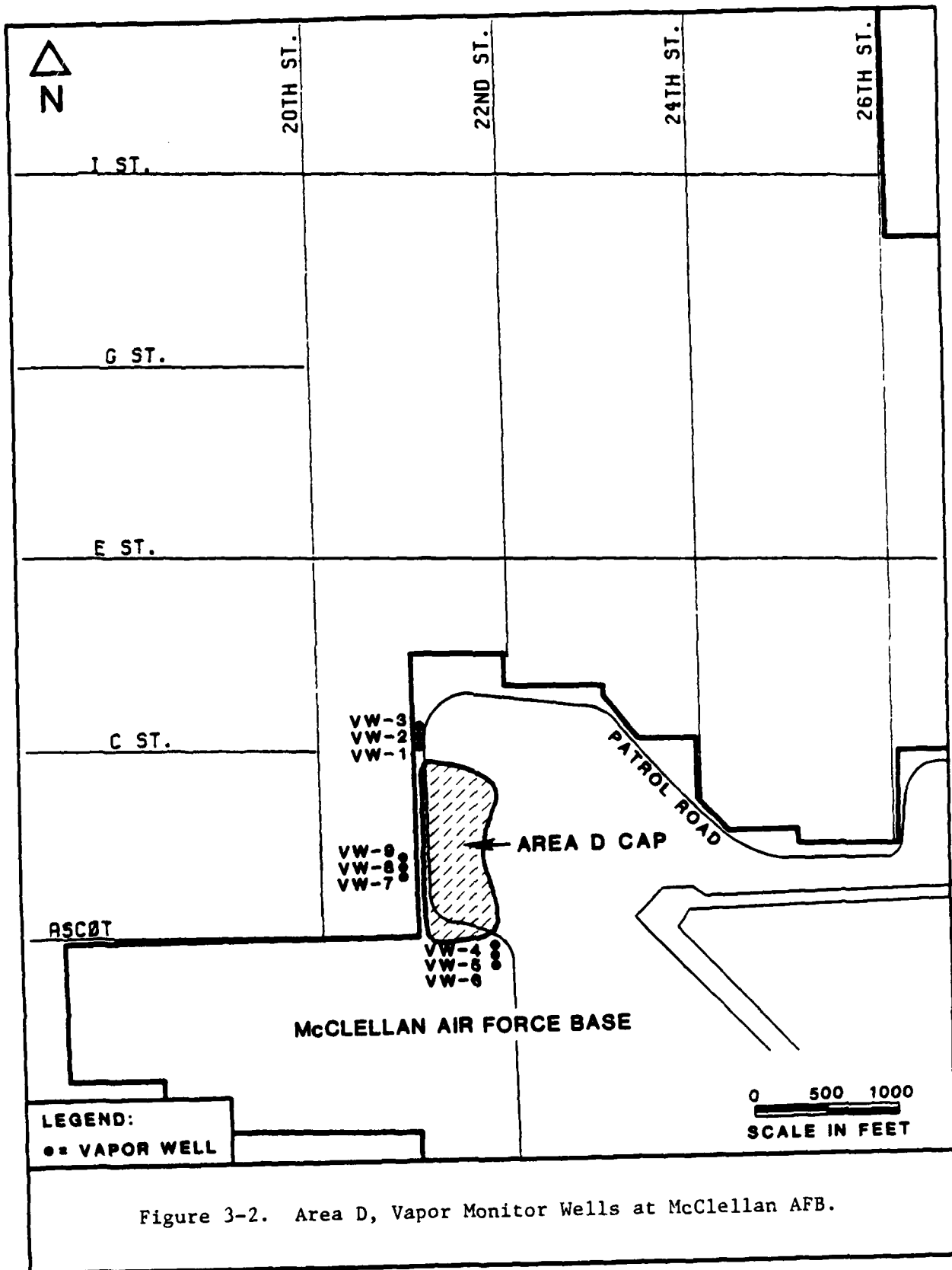
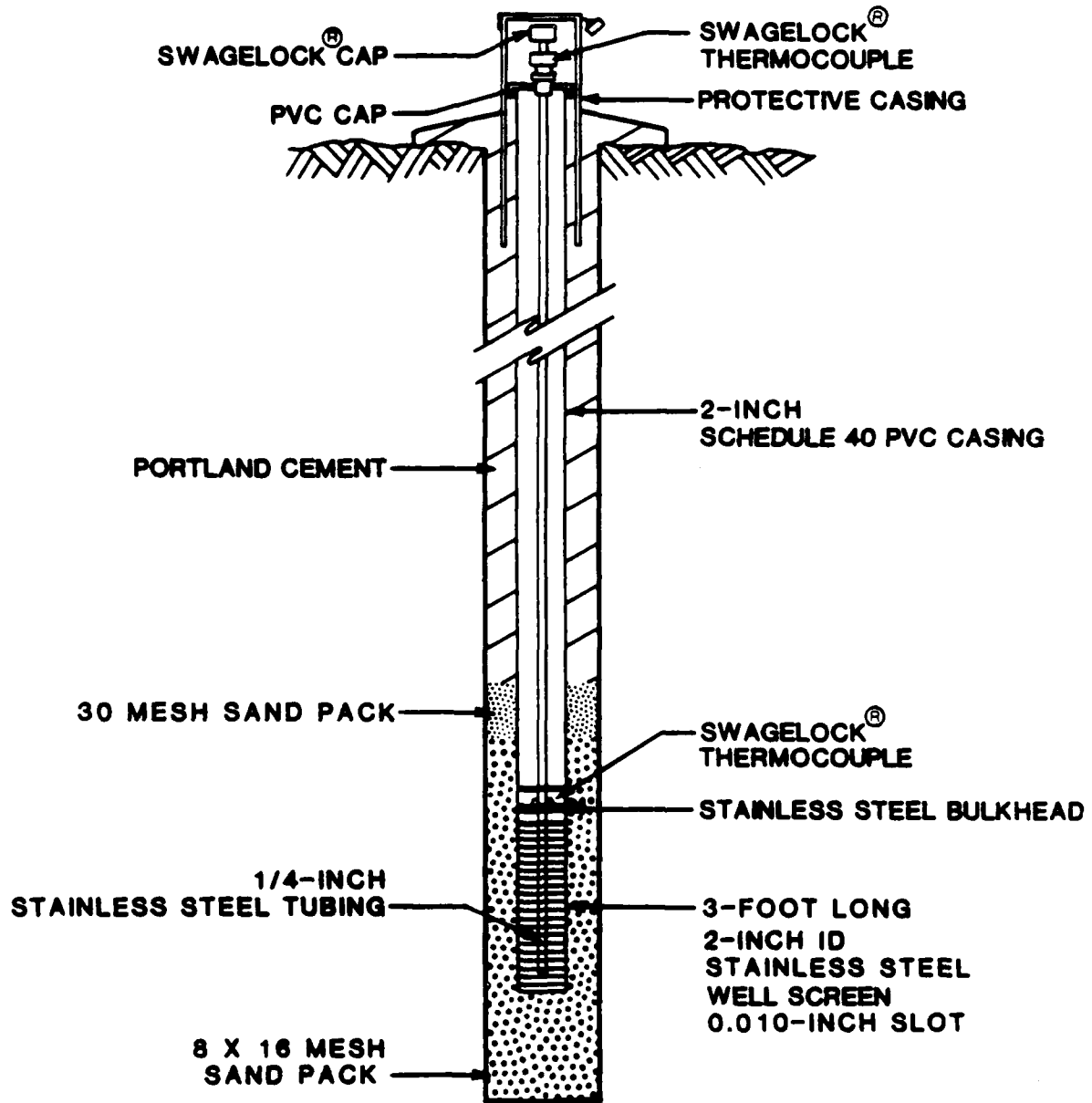


Figure 3-2. Area D, Vapor Monitor Wells at McClellan AFB.



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Figure 3-3. Schematic Diagram of Area D, Soil Vapor Well Completion at McClellan AFB.

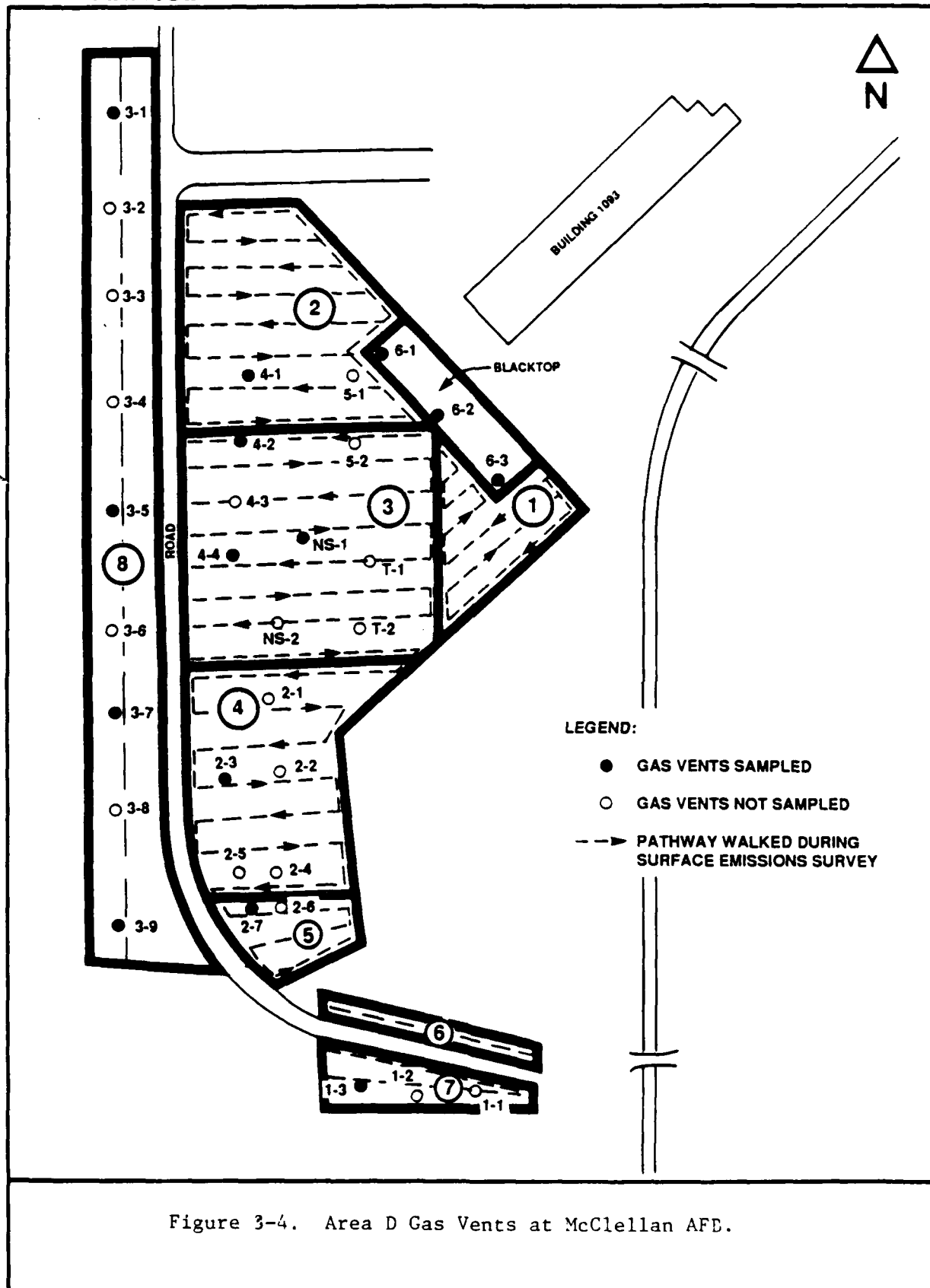


Figure 3-4. Area D Gas Vents at McClellan AFB.

The population of the surrounding communities, as determined by the 1980 Census, is 107,822. A summary of population by community and tract number, as well as projected populations for the year 2005, is presented in Table 3-2. The tract areas presented in this table are shown in Figure 3-5.

3.2.2 Land Use

Land use in the vicinity of the base consists of a complex combination of military, industrial, commercial, residential, and agricultural zones, as presented in Figure 3-6.

The majority of the land use surrounding the base is residential. In the Rio Linda area northwest of the base, most of the land is used for agricultural-residential purposes. This land category identifies areas that are reserved for large-lot, rural, residential uses where animals may be kept and crops may be raised for recreational, educational, personal consumption, or income-supplement purposes (Sacramento County, 1985).

Several Rio Linda lots directly adjacent to the base have been zoned as industrial-intensive. This land category identifies areas reserved for research, manufacturing, processing, and warehousing activities. Necessary public services, such as sewer and water systems, are available in industrial-intensive areas.

Most of the land use to the southwest and east of the base consists of low density residential zones. These areas are reserved for a planned population density range of 5 to 30 persons per acre, or a housing density range of 1 to 12 dwelling units per acre.

Also found to the southwest and east of McClellan AFB are parcels designated for commercial and office use. This land use category includes shopping centers, large office complexes, and major concentrations of strip commercial development.

TABLE 3-2. POPULATION DATA AND PROJECTIONS FOR THE COMMUNITIES
SURROUNDING McCLELLAN AFB

Tract Community	1980 Census Tract Number	Projected 2005 Population	Projected Population
Rio Linda and Elverta	72.01	3,689	
	72.02	3,547	
	72.03	6,737	
	TOTAL	13,973	26,529
North Highlands	73.00	1,541	
	74.02	6,207	
	74.03	4,451	
	74.04	3,511	
	74.06	7,044	
	74.07	7,959	
	74.08	9,819	
	74.09	7,262	
	75.00	11,010	
	TOTAL	58,804	118,861
North Sacramento	72.04	1,613	
	63.00	3,578	
	64.00	4,514	
	65.00	3,406	
	66.00	4,621	
	67.00	7,365	
	68.00	5,644	
	69.00	4,304	
	TOTAL	35,045	52,682

Source: Sacramento County, 1985.

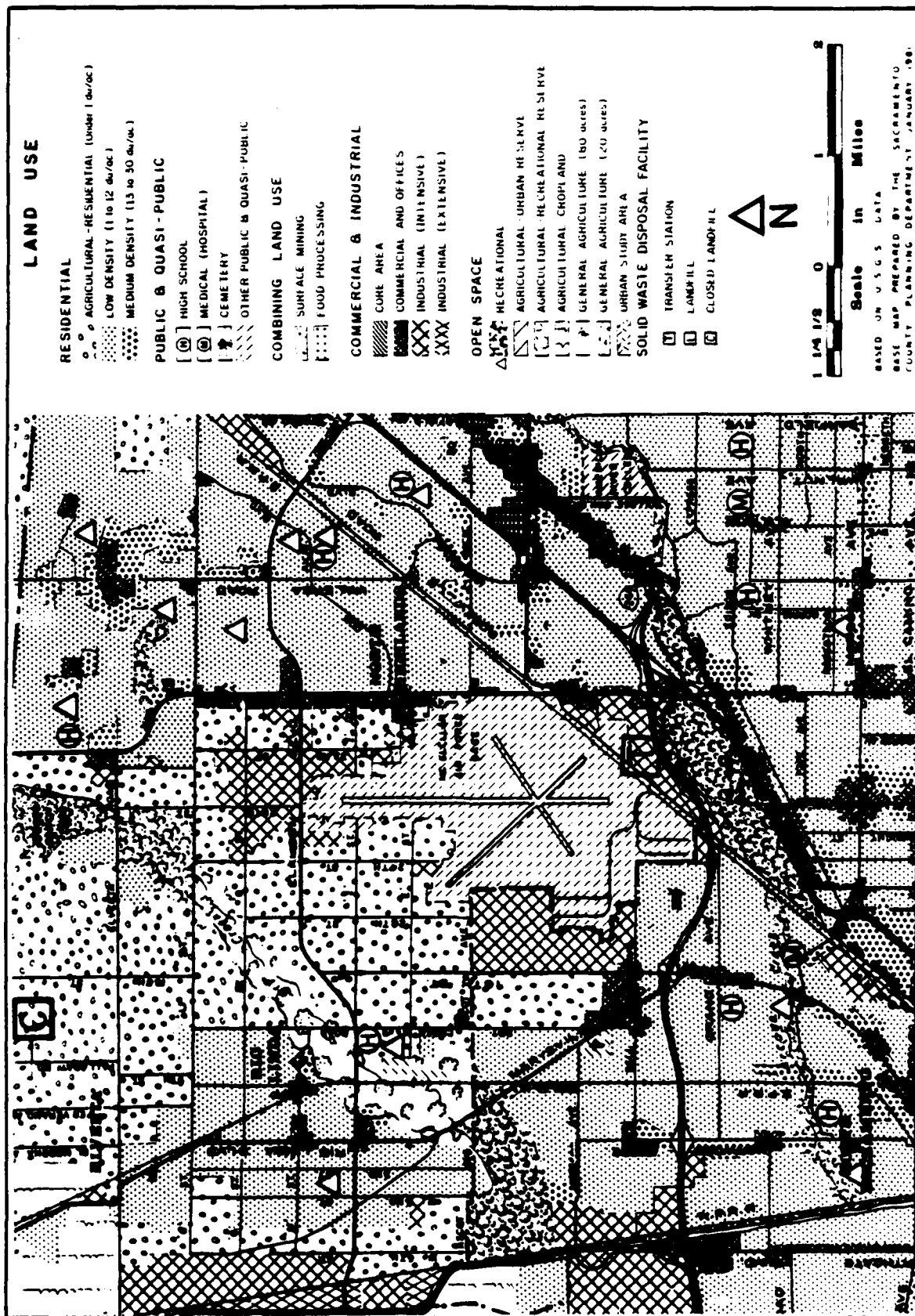


Figure 3-6. Land Use in the Vicinity of McClellan AFB.

SOURCE: Sacramento County, 1985

Del Paso Park, designated as a recreational area, is located within one mile southeast of the base. Additional agricultural-recreational reserve areas are located along Dry Creek, which is approximately two miles west of the base.

4.0 MONITORING SYSTEM

This section describes the sampling and analysis methods used to collect and analyze soil-gas samples at the 13 inactive landfills.

4.1 Sampling Approach

The objective of the sampling effort was to provide a preliminary characterization of the air emissions, landfill gas generation, and landfill gas migration potentials for 13 sites on base. The sampling approach was developed in accordance with the Testing Guidelines for Active Solid Waste Disposal Sites (California State Air Resources Board, 1987).

Screening of landfill emissions was conducted at the surface of each landfill using a Foxboro Corporation Model OVA-108 real-time organic-vapor analyzer. Screening for total hydrocarbon concentrations near the landfill surface was performed to identify areas of landfill gas emissions. This information was used to assist in the selection of soil-gas probe sampling locations, and to obtain representative gas generation and migration information.

To determine the composition of landfill gases, soil-gas probes were installed in the interior of each landfill (landfill soil-gas probes). It was proposed that each probe be installed to a depth of eight feet below the land surface. The locations of the probes within the landfill were selected to provide spatial coverage of the landfill. For some landfills with physical obstructions or barriers, this procedure was not possible. In the event that probes could be installed and sampled in the interior areas of the landfill, additional perimeter probes were installed and sampled. Landfill gas samples were analyzed for methane, fixed gases (carbon dioxide, nitrogen, and oxygen), and the 10 specified air contaminant compounds listed in Table 1-1.

To determine whether subsurface migration of landfill gas had occurred outside of the landfill boundary, soil-gas probes were installed on the perimeter of each landfill site (perimeter soil-gas probes). As required

by California Air Resources Board (ARB) guidelines, it was proposed that each perimeter soil-gas probe would be installed to a depth of six feet below the landfill surface. A frequency of one probe per 1,000 feet of perimeter was used when applicable. At least one perimeter probe was installed per site. The selection of perimeter ground probe locations considered the location and proximity of occupied buildings. One or more perimeter soil-gas probes was located between the landfill and any nearby buildings. In some cases, perimeter probes were used to further identify the perimeter of each landfill, augment characterization of landfill gas generation potentials, and identify the perimeter of a clustering of landfills located close to one another. Soil-gas samples taken from perimeter probes were analyzed for methane, carbon dioxide, nitrogen, oxygen, and the specified air contaminant compounds listed in Table 1-1.

Soil-gas sampling from the Area D vapor wells and gas collection systems was performed to determine if landfill gas generation and migration was occurring. Each of the 9 vapor monitor wells were sampled, and 14 of the 32 gas vents were sampled at random. Prior to sampling, a volume of air equivalent to two well volumes was purged from each of the wells and vents.

Prior to installation of landfill and perimeter soil-gas probes, sampling locations were checked against historical site data to accurately locate the landfill site in an effort to avoid buried pipelines, tanks, and electrical and water service. Base "digging permits" were obtained to ensure that soil-gas probes were located so as not to interfere with existing underground utilities. McClellan AFB Environmental Management (EM) personnel were often present to verify these clearances prior to initiation of the soil-gas probe installation. In addition, a Fisher m-scope pipe and cable locator were used as a final check prior to installing soil-gas probes. Landfill probe locations were generally selected along the centerline of each landfill area in order to minimize any error resulting from incorrectly identifying landfill locations from historical aerial photographs and site location maps. Landfill perimeter probe locations were selected based on approximate estimates for each landfill area but are most impacted from any error resulting from incorrectly identifying each landfill boundary. Therefore, the landfill perimeter probe locations and results should be evaluated from this perspective.

4.2 Probe Description

This section describes the sampling procedures for the soil-gas monitoring probes used at each of the 13 inactive landfill sites investigated. Figure 3-1 presents the locations of the 13 inactive landfills and identifies the approximate location of the vapor wells and gas vents in Area D. Individual site maps that present the sampling locations are found in Section 5.0.

Landfill and perimeter probes were driven into the ground by a hydraulically driven pusher/puller mechanism. The probes were then purged by withdrawing two probe volumes using a vacuum pump. After purging, and while the soil gas was being drawn through the probe, a gas sample was taken using a glass syringe, which was inserted through a section of silicone tubing (leading to the pump) and into the stainless steel tubing in the adaptor. A schematic diagram of the probe, silicon tubing and syringe sampling system is presented in Figure 4-1. Gas samples only came into contact with steel surfaces and were never came into contact with potentially sorbing materials (e.g., tubing, hose, pump diaphragm). A vacuum gauge monitored the negative pressure in the evacuation line to determine if there was any impedance to the gas flow caused by the attempt to sample in clay or water-saturated soils.

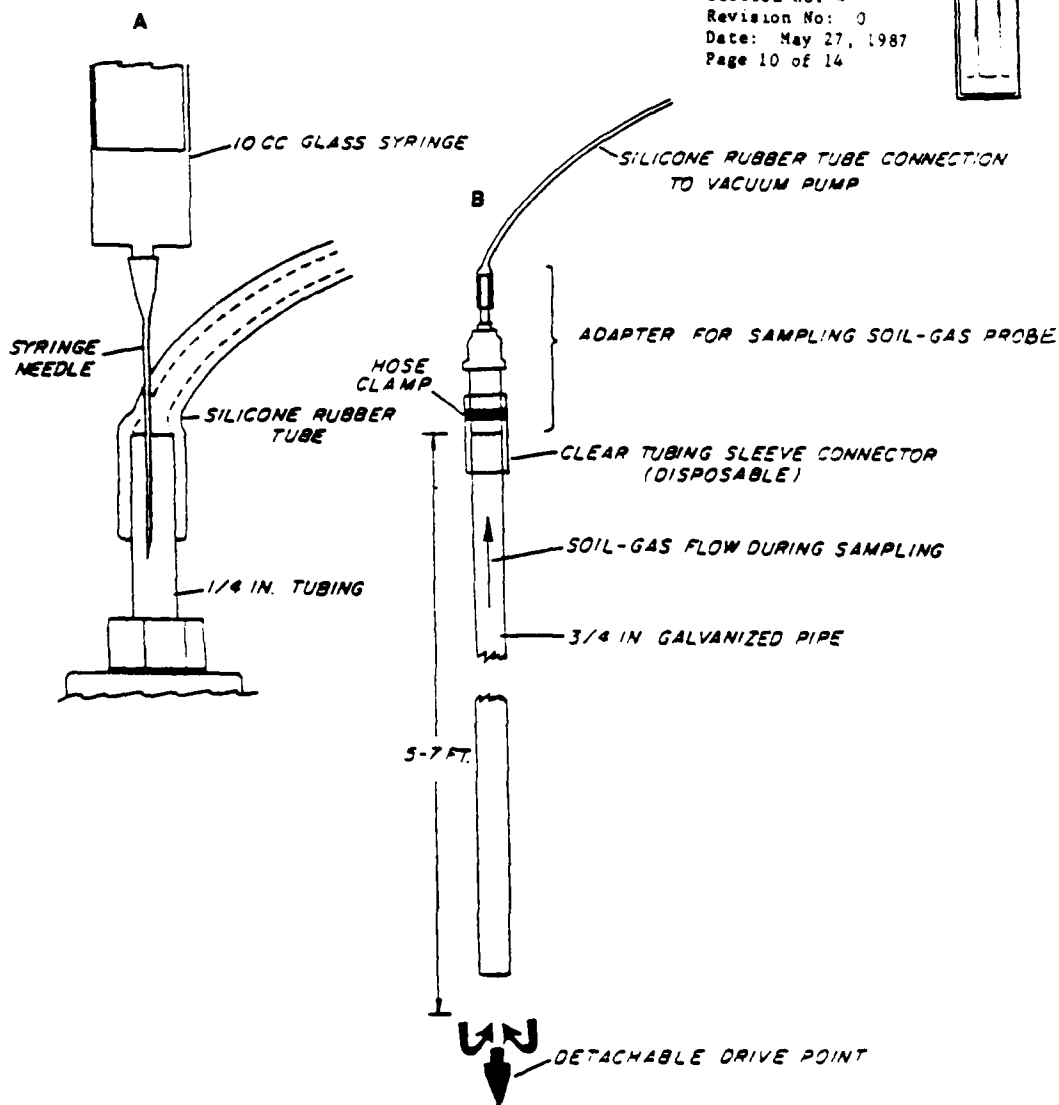
One or two 10 ml gas samples were collected from each sampling probe after one to four minutes of pumping. These 10 ml samples were subsampled according to analytical requirements, and replicates were injected into the gas chromatograph for documentation of reproducibility. More than two injections may have been necessary where there were multiple contaminants that required different sample sizes for chromatographic analysis. The reproducibility of soil-gas samples from the same probe is typically within 20 percent and always within a factor of two.

Closure of the subsurface gas sampling sites involved removing the probe and filling the probe hole with native fill materials.

A brief description of the Tracer Research Standard Operating Procedure as performed in the field, is presented below:

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A. Close up of syringe soil gas sampling through evacuation line.

B. Diagram of soil gas sampling probe with adapter for sampling and evacuation of the probe after it is driven into the ground.

Figure 4-1. Soil-Gas Sampling Schematic.

- Probe Placement

- A clean probe (pipe) was removed from the "clean" storage tube on top of the van.
- The soil-gas probe was placed in the jaws of the hydraulic pusher/puller mechanism.
- A drive point was attached to the bottom of the probe.
- A hydraulically driven pushing mechanism was used to drive the probe into the ground.
- If the mechanism would not drive the probe into the ground to a required depth for sampling, a hydraulically activated hammer was used to pound the probe into the ground.

- Sample Extraction

- An adaptor was put onto the top of the soil-gas probe (see Figure 4-1[B]).
- A vacuum pump was hooked onto the adaptor and turned on and used to evacuate soil.
- For samples having evacuation pressures less than 15 inches of mercury, evacuation took at least 30 seconds, but never more than five minutes. Evacuation times were at least one minute, but no more than five minutes, for samples having evaluation pressures greater than 15 inches of mercury.
- Gauges on the vacuum pump were checked for excessive soil resistance by monitoring pressure reading (inches of

mercury). A reading of at least two inches of mercury less than maximum vacuum was used to extract sufficient soil gas to collect a valid sample.

- Sample Collection

- With the vacuum pump running, a hypodermic syringe needle was inserted through the silicone rubber and into the stainless steel tubing of the adaptor (see Figure 4-1[A]).
- Gas samples only came into contact with steel surfaces, never with potentially sorbing materials (e.g., tubing, hose, pump diaphragm).
- The syringe was purged with soil gas. Without removing the syringe needle from the adaptor, a 2 to 10 ml soil-gas sample was collected.
- A second 10 ml sample was collected using the same procedure.

- Demobilization

- The vacuum pump was turned off and disconnected from the adaptor.
- The adaptor was removed and stored with equipment to be cleaned.
- Using the hydraulically operated puller mechanism, the probe was removed from the ground.

- The probe was stored in the "used" probe tube on top of the van.
- The probe hole was backfilled, if required.
- A field log book was completed at the end of each day. The type of information supplied in this log book included:
 - Time (military notation) of sample;
 - Sample number;
 - Location of sample;
 - Sampling depth;
 - Evacuation time before sampling;
 - Inches of mercury on vacuum pump gauge;
 - Probe and adaptor numbers;
 - Number of sampling points used;
 - Observations (e.g., ground conditions, concrete, asphalt, soil appearance, surface water, odors, vegetation, etc.); and
 - Backfill procedure and materials, if used.
- Determination of Sampling Locations. The quality control procedures for reusable equipment usage are described below.

- Steel probes were used only once and then washed with high-pressure soap and hot water spray or steam-cleaned at the end of the day to eliminate the possibility of cross-contamination. Forty-two probes were carried on each van so that no probes would have to be reused during the day.
- Probe adaptors (steel reducer and tubing) were used once during the course of the day and cleaned at the end of each working day by baking in the gas chromatography oven. The tubing was replaced periodically as needed during the job to ensure cleanliness and good fit.
- Silicone tubing (connecting the adaptor to the vacuum pump) was replaced as needed to ensure proper sealing around the syringe needle. This tubing did not directly contact soil-gas samples.

Glass syringes were usually used for only one sample per day and were washed and baked-out at night. If they were used twice, they were purged with carrier gas (nitrogen) and baked-out between probe samplings.

- The septa through which soil-gas samples were injected into the chromatograph were replaced daily to prevent possible gas leaks from the chromatographic column.
- Subsampling syringes (2 cc) were checked for contamination prior to sampling each day by injecting nitrogen carrier gas into the gas chromatograph.
- All sampling syringes and 2 cc subsampling syringes were decontaminated each day, and none were reused before being decontaminated. Microliter-size subsampling syringes were reused only after a nitrogen carrier gas blank was run to ensure they were not contaminated by the previous sample.

- Soil-gas pumping was monitored by a vacuum gauge to insure that an adequate gas flow from the vadose zone was maintained.

4.3 Analytical Instrumentation

Two Varian Model 3300 gas chromatographs were used for each gas analyses. The analysis of the non-fixed gas compounds was performed on one column with the electron capture detector and the photoionization detector placed in series. Specific instrumentation used for analyzing specific gases are described below:

- Carbon dioxide (CO_2), oxygen (O_2), nitrogen (N_2), and methane (CH_4) were all analyzed on an Alltech CTR I column and analyzed by gas chromatography using a Thermal Conductivity Detector (TCD).
- Benzene and vinyl chloride were analyzed on a 6-foot by 0.125-inch column packed with 60/80 mesh 0.1% SP-1000 on Carbon B using a photoionization detector (PID) manufactured by Photovac.
- Methylene chloride, 1,2-dichloroethane (DCA), chloroform, methyl chloroform (TCA), carbon tetrachloride, trichloroethylene (TCE), ethylene dibromide (EDB), and perchloroethylene (PCE) were analyzed on a 6-foot by 0.125-inch column packed with 60/80 mesh 0.1% SP-1000 on Carbopac B and analyzed by gas chromatography using an Electron Capture Detector (ECD).

The gas chromatograph instruments have been modified by the addition of a dryer, composed of ionic polymer materials, situated between the injector and the head of the column. Thus, the sample was injected using a syringe inserted through a septum into the injector, where liquid samples are vaporized. The vapors proceeded through the dryer, where all water vapor from the liquid sample or soil-gas sample was absorbed, and then proceeded through the gas chromatography column to the detector.

4.4 Analysis Methods

The analytical operating procedures used by Tracer Research Corporation (TRC) for testing program included: gas chromatography-photoionization detection (GC-PID); gas chromatography-electron capture detection (GC-ECD); and gas chromatography-themoconductivity detection (GC-TCD).

TRC uses analytical standards from chemical standard from Chem Services, Inc. of Westchester, Pennsylvania that are pre-analyzed for certified purities and lot numbered for quality control assurance. Each vial or gas cylinder is marked with an expiration date. All analytical standards are the highest grade available. Certified purities are typically 99 percent.

The preparation of standards and a description of quality control procedures are given below.

- Liquid Standards:

1. A fresh standard was prepared each day. The standards were made by serial dilution.

- a. First, a stock solution containing the standard in methanol was prepared at TRC offices in Tucson. The stock solution was prepared by pipetting the pure chemical into 250 ml of methanol in a volumetric flask at room temperature. The absolute mass was determined from the product of volume and density calculated at room temperature. Hamilton microliter syringes, with a manufacturer's stated accuracy of ± 1 percent, were used for pipetting. Information on density was obtained from the Chemical Rubber Company (CRC Handbook). Once the stock solution was prepared, typically in concentration range of 50 to 1,000 ppm, a working standard was prepared in water each day. The solute in the stock solution has a

strong affinity to remain in methanol so there was no need to refrigerate the stock solution. Additionally, the solute tends not to biodegrade or volatilize out of the stock solution.

- b. The working standards were prepared in 42 ml volatile organic analysis (VOA) septum vials by diluting the appropriate ug/l quantity of the standard solution into 42 ml of water.
2. The standard water was analyzed for contamination before making the aqueous standard each day.
3. The aqueous standard was prepared in a clean vial using the same syringe each day. The syringe was only used for that standard.
4. Final dilutions of the calibration standards were made in water in a VOA vial having a Teflon® coated septum instead of in an evacuated container. The VOA bottle permits mixing of the standard solution and subsequent syringe sampling throughout the day without opening the bottle or exposing it to air. The measurement uncertainty inherent in the use of a VOA bottle instead of a volumetric flask is approximately 1 percent.
5. The aqueous standard contained the compounds of interest in the range of 5 to 100 ppb, depending on the detectability of the individual components. The standard was analyzed at least three times at the start of each day to determine the mean response factor (RF) for each component. The standard was injected again after every fifth sample to check detector response and chromatographic performance of the instrument throughout the day.

6. The RF allowed conversion of peak areas into concentrations for the contaminants of interest. The RF used was changed if the standard response varied 20 percent. If the standard injections varied by more than 20 percent, the standard was repeated.

If the mean of the two standard injections was greater than a 20 percent difference, a third standard was injected and a new RF was calculated from the three standard injections. A new data sheet was started with the new RFs and calibration date.

Percent relative percent difference =

$$\frac{A \text{ Area} - B \text{ Area}}{(A \text{ Area} + B \text{ Area}/2)} \times 100$$

Where: A = mean peak area of standard injection from
first calibration

B = peak area of subsequent standard injection

7. The low ppb aqueous standards that were made fresh daily need not be refrigerated during the day because they do not change significantly in a 24-hour period. Often, the unrefrigerated 24-hour old standards have been compared with fresh standards and no difference has been measurable. If the standards were made at high ppm levels in water, the problem of volatilization would probably be more pronounced in the absence of refrigeration.
8. Primary standards were kept in the hotel room when in the field.

- Syringe Blanks

1. Each microliter syringe was blanked before use.

2. If ambient air concentrations were $<.01$ ug/l for components of interest, a representative sample of at least two syringes of each size (10 cc and 2 cc) were blanked at the start of each day. If representative syringes were "clean" (no detectable contaminants) remaining syringes were not blanked. If any of representative syringes show contamination, all 2 cc and 10 cc syringes were blanked prior to use.
 3. Syringe blanks were run with nitrogen.
 4. If it was necessary for any syringe to be used again before cleaning, it was blanked prior to its second use.
- System Blanks
 1. System blanks consisted of ambient air drawn through the probe and complete sampling apparatus and analyzed by the same procedure as a soil-gas sample. The probe was above the ground.
 2. One system blank was run at the start of each day.
 3. An ambient air sample was collected at the same time and at the same location as the system blank.
 4. The ambient air sample was also analyzed. A comparison of results did not indicate contamination within the sampling equipment.
 5. The system blanks were taken at locations away from actual soil-gas sampling locations.

- Samples

1. All unknown samples were analyzed at least twice, or until reproducibility was within 25 percent, computed as follows:

$$\text{Relative Difference} = \frac{A - B}{(A + B)/2}$$

Where: A = is first measurement result

B = is second measurement result

If the difference was greater than 0.25, a subsequent sample was run until two measurements were made that had a difference of less than 0.25. Those two measurements were used in the final calculation for that sample.

2. The injection volume was adjusted so that the mass of analyte was as near as possible to the mass that is contained in the standard (at least within a factor of 10).
3. Whenever possible, the attenuation for unknown samples was kept constant through the day to provide a visual check of integrations.
4. A water plug was used as a gas seal in microliter syringes.
5. A seal was established between syringes when subsampling.
6. All sample analyses were documented (Appendix B).

7. Separate data sheet are used if chromatographic conditions changed.
 8. Everything was labeled in ug/l, mg/l, etc. PPM and PPB notations were avoided.
- Daily System Preparation
 1. Integrator parameters were initialized according to the following criteria:
 - a. Point evaluation
 - b. Attenuation
 - c. Peak markers
 - d. Auto zero
 - e. Baseline offset (mininum 10 percent of full scale)
 2. The baseline was checked for drift, noise, etc.
 3. The following system parameters were set:
 - a. Gas flows (Note: N₂, air, and He tank pressures).
 - b. Temperatures
 - 1) Injector
 - 2) Column
 - 3) Detector
 4. After the last analysis of the day, conditioned septa were rotated into injection ports used during the day and replaced with fresh septa.
 5. Column and injector temperatures were increased to bake out residual contamination.

6. Syringes were cleaned each day.
 - a. 2 cc and 10 cc syringes were cleaned with Alconox or equivalent detergent and brush.
 - b. Microliter syringes were cleaned daily with IFA or MeOH and purged with N_2 . Syringe Kleen was used to remove metal deposits in the barrel.
 - c. Syringes were baked in the gas chromatograph oven overnight at a minimum temperature of 60°C to drive off organic contaminants which may have absorbed onto the syringe material.

5.0 RESULTS

This section presents the results of testing activities conducted December 2nd through December 15th, 1987 at the McClellan Air Force Base (AFB) for 15 sites (13 landfills and 2 gas monitoring systems associated with Area D cap). Testing was conducted following the procedures described in "McClellan AFB Calderon Investigation Draft Quality Assurance Project Plan (QAPP)" (Radian Corporation, 1987). This project plan was approved by a Sacramento County Air Pollution Control Officer.

The general sampling information provided in Section 5.1 is pertinent to all samples collected. This section provides information on ambient air monitoring, data evaluation, sampling conditions, emissions screening, and land use surrounding the base. Section 5.2 contains site-specific results for all 13 landfill sites sampled. The detailed information provided in this subsection includes a site description, the number of samples analyzed, the results of sampling and daily weather information for the period just prior to and during the field activities.

5.1 General Sampling Information

5.1.1 Ambient Air

Ambient air testing was not performed as part of the landfill testing program for any of the sites. The decision to proceed with subsequent ambient air testing will be based on the interpretation of the landfill gas characterization and gas migration results presented in this document.

5.1.2 Data Interpretation

All analytical data were evaluated on the basis of the limits of detection and quantitation. This evaluation protocol is an accepted practice when sample results are at or near method detection limits. Detection and quantitation limits are defined as follows:

- Limit of Detection (LOD) - the minimum concentration of a compound that can be determined to be statistically different from a blank. At a confidence level of 99 percent, the LOD = (average blank concentration) + (3 x standard deviation of blanks). For compounds not detected in any blank, the LOD is assumed to equal the method detection limit or analytical detection limit.
- Limit of Quantitation (LOQ) - the concentration of a compound above which quantitative results are obtained with a specified degree of accuracy. For an uncertainty of ± 30 percent and a confidence level of 99 percent, the LOQ = (average blank concentration) + (10 x standard deviation of blanks). For compounds not detected in any blank, the LOQ equals 3.3 times the method detection limit.

The analytical detection limit and the required detection limits are given in Table 5-1. The limits of detection and quantitation are also given in Table 5-1. The raw data used to calculate the limits of detection and quantitation are given in Appendix B. Limits of detection and quantitation for oxygen and nitrogen have not been calculated because these compounds are naturally occurring at concentrations.

The analytical results are presented in Tables 2-1 through 2-15 (condensed analytical results are included in Appendix A; raw analytical data are included in Appendix B). Additional sampling result summaries are presented in this section for each of the investigated sites. The focus of these additional tables is to present the maximum concentration values that exceeded the limit of quantitation and are considered valid results with a high degree of certainty.

5.1.2.1 Quality Assurance

Quality assurance activities associated with the testing program include a multipoint (three point) calibration of the field gas chromatograph

TABLE 5-1. LIMITS OF DETECTION AND QUANTITATION^a

Compound	Required Detection Limits ^b (ppbv)	Analytical ^c		Average Reagent Blank Concentration (ug/l)	Standard Deviation of Blank Concentrations	Limit of ^d Detection		Limit of ^e Quantitation ^e	
		(ug/l)	(ppbv)			(ug/l)	(ppbv)	(ug/l)	(ppbv)
Vinyl Chloride	500	0.050	17.9	N/D	N/A	0.050	17.9	0.165	59.1
Benzene	500	0.045	12.9	N/D	N/A	0.045	12.9	0.149	42.6
Ethylene Dibromide	1	0.001	0.119	N/D	N/A	0.001	0.119	0.003	0.393
Ethylene Dichloride	20	0.08	18.1	N/D	N/A	0.08	18.1	0.264	59.7
Methylene Chloride	60	0.089	23.5	N/D	N/A	0.089	23.5	0.294	77.6
Perchloroethylene	10	0.001	0.135	N/D	N/A	0.001	0.135	0.003	0.446
Carbon Tetrachloride	5	0.0002	0.029	N/D	N/A	0.0002	0.029	0.001	0.096
Methyl Chloroform	10	0.001	0.168	N/D	N/A	0.001	0.168	0.003	0.554
Trichloroethylene	10	0.001	0.17	N/D	N/A	0.001	0.17	0.003	0.561
Chloroform ^f	2	0.002	0.376	N/D	N/A	0.002	0.376	0.007	1.24
Methane (%) ^f	N/S	0.29	N/A	N/D	N/A	0.29	N/A	0.96	N/A
Carbon Dioxide (%) ^f	N/S	0.67	N/A	N/D	N/A	0.67	N/A	2.2	N/A
Oxygen (%) ^f	N/S	1.9	N/A	N/D	N/A	1.9	N/A	3.3	N/A
Nitrogen (%) ^f	N/S			N/D	N/A			3.6	N/A

^a Limits were calculated based on analytical detection limits.

^b These method detection limits are required by Attachment 2 of the Hazardous Waste Disposal Site Testing Guidelines, ARB, 1987.

^c Analytical detection limit is equivalent to the method detection limit.

^d The limit of detection is defined as the minimum concentrations that can be determined to be statistically different from a blank. For compounds not detected in any blank, the LOD equals the analytical detection limit.

^e The limit of quantitation is defined as the concentration above which quantitative results are obtained with a specified degree of confidence. For compounds not detected in any blank, the LOQ equals 3.3 times the analytical detection limit.

^f Units are percent (%).

N/A = Not applicable.

N/D = Not detected in any blank.

N/S = Not specified.

NOTE: Compliance with the required detection limits is demonstrated by comparison of the required detection limits to the analytical detection limits.

(GC) daily response factor checks, daily system (probe) and air blanks, each sample analyzed in duplicate, and duplicate sampling and analysis using duplicate probes. The results of these activities for the period of December 2 through December 15, 1987 are presented in Appendix B and discussed below.

Prior to initiating field sampling and analysis, a three-point calibration of the field GC was performed for all 14 test species, except vinyl chloride. The correlation coefficient for the multipoint calibration ranged from 0.949 to 0.999 for nitrogen. The average correlation coefficient was 0.993, which was slightly below the target correlation coefficient of 0.994. Twelve of the 14 compounds had correlation coefficients greater than 0.995. A summary of the instrument, detector and column, and the multipoint calibration information, provided by the Tracer Research Corporation, is presented in Appendix F.

A single-point calibration was performed daily to determine the daily average response factor for each compound. This single-point check was repeated after ten samples to determine instrument drift. All 14 compounds were within the acceptance criteria of ± 20 percent change in response factor. All single-point calibration data are considered acceptable.

Daily system blank checks (through the probe) and air blank samples were performed to determine if probe contamination existed. The system blank concentrations were equivalent to the air blank concentration except for trichloroethylene. For trichloroethylene, the system blank concentrations were one order of magnitude higher than the air blank.

The reagent blank data were used to determine the limits of detection and quantitation for the individual compounds as discussed in Section 5.2. The calculated limits of detection and quantitation were less than or equal required detection limits for all compounds listed in the "Hazardous Waste Disposal Site Testing Guideline," ARB, 1987. These results indicate that the sampling and analysis methodologies were sufficient to meet the testing program objectives.

Duplicate samples were collected using a separate sampling probe, one foot apart from the original sampling point. Six of the 14 components were detected in both samples. The recommended acceptance criteria for the precision of a field activity is a coefficient of variation (CV) of ≤ 50 percent. This allows for any sampling variability. The CVs for the duplicate sample ranged from 0 to 47 percent, meeting the recommended acceptance criteria.

A daily checklist was completed by the field technician. The list was prepared at the end of the day as a final check to ensure all the Quality Control (QC) checks had been performed by the field personnel.

5.1.3 Sampling Conditions

The "Hazardous Waste Disposal Site Testing Guidelines" identify specific and minimum sampling conditions for collecting surface landfill, and perimeter gas samples (California Air Resources Board, 1987). Precipitation and temperature are both important factors in assessing the usefulness of the sample results. Table 5-2 summarizes the temperature and precipitation data collected by the McClellan AFB, Detachment 8, 17th Weather Squadron for the months of November and December 1987.

The weather conditions summarized in Table 5-2 indicate rain periods throughout the sampling program (December 4th through 15th). The only sampling events that had no rain 72 hours prior to sampling occurred on December 14th and 15th. Hand augers were used whenever possible to determine how deep, the zone of water saturation extended. In almost all cases the zone extended no more than three feet. Discussions of the hand augering performed on each day of sampling can be found in Section 5.2.

5.1.4 Gas Characterization

Landfill gas characterization consisted of an emissions screening survey and landfill gas testing. An emissions screening survey of each

TABLE 5-2. WEATHER CONDITIONS FOR McCLELLAN AFBa

Date	Number of Samples Collected	Precipitation (inches)	Peak Wind (knots)	Temperature Range (°F)	Mean Temperature (°F)
NOVEMBER					
20	--	0.31	14	57 - 50	54
21	--	0.01	7	57 - 48	53
22	--	0	2	55 - 39	47
23	--	0	6	5 - 37	46
24	--	0	12	60 - 44	52
25	--	0	0	61 - 42	52
26	--	0	0	59 - 35	47
27	--	0.02	0	58 - 34	46
28	--	0	0	59 - 40	50
29	--	0	0	57 - 43	50
30	--	1.27	0	53 - 47	50
DECEMBER					
1	--	0.35	0	60 - 49	55
2	2P	0.06	0	65 - 56	61
3	1P	0	10	67 - 56	62
4	6P	0.33	12	60 - 51	56
5	9P	0.01	0	58 - 53	56
6	--	0.54	0	59 - 52	56
7	5V/9P	0	0	59 - 48	54
8	1V	0.49	0	54 - 39	47
9	5V/7P	0.1	0	60 - 52	56
10	10P	Trace	0	65 - 52	59
11	13P/1V	0	0	58 - 44	51
12	--	0	0	56 - 41	49
13	--	0	0	53 - 36	45
14	6P/4V	0	0	48 - 35	42
15	2P/7V	0.05	0	53 - 38	46
16	--	1.12	0	51 - 44	48
17	--	0	7	57 - 37	47
18	--	0.02	6	53 - 38	46
19	--	0.01	8	58 - 42	50
20	--	0	8	48 - 37	43
21	--	0.07	6	52 - 42	47
22	--	0.18	16	54 - 43	49

SOURCE: McClellan AFB, Detachment 8, 17th Weather Squadron.

a Data obtained from on-base monitoring.

b 1987.

P - Probe

V - Vapor well

-- - No samples collected.

landfill was performed on November 23, 1987. During the survey, a technician walked over each disposal site surface with a portable flame ionization detector. The detector used was a Foxboro Corporation Model OVA-108 Organic Vapor Analyzer, which has a calibrated range of 1 to 10,000 parts per million volume (ppmv) total hydrocarbons (calibrated as methane in air). The technician measured for landfill gas by holding the instrument probe within three inches of the landfill surface while walking a grid pattern over the entire site. The technician measured background levels before and after the survey by standing at the upwind end of the disposal site, holding the detector probe ten feet above the ground, and noting the reading after one minute.

The background level measured before and after the emissions screening survey was equal to or less than 3.5 ppm. During the emissions screening survey, no levels exceeding the background level were measured. No readings above the 50 ppm methane criteria were observed. The emissions screening included measurements across each landfill and along the perimeter of the landfill. In some cases only the perimeter was accessible due to physical barriers such as buildings or stored construction materials. The path traveled for each landfill during this screening is presented in Appendix C. The path traveled for Area D is presented in Figure 5-17. Meteorological observations during the survey were: 3-4 mph wind, no rain, and temperatures ranging from 47 to 70°F (see Table 5-2). The emission screening data sheet and instrument calibration sheet are also included as Appendix C.

5.1.4.1 Analytical Results and Field Identification Numbering System

The following numbering system has been established for identifying the sample results of the field testing. Two corresponding sets of numbers have been identified for each set of soil-gas analytical results. The analytical results numbering system is used to identify the locations of the landfill and gas migration samples in each of the site maps and in the analytical results summaries. The analytical results identification (ID) numbering system is a two-number sequence. The first number corresponds to the site number and is followed by a number in parenthesis identifying a

unique sample location. For example, the sample number 12(2) identifies the sample location "(2)" for Site 12. The field ID numbering system is footnoted in the data summaries in Section 2.0. The raw data is presented in Appendices A and B and were generated by Tracer Research Inc., a subcontractor to Radian Corporation.

The field ID number is an alpha numeric designation, beginning with a two digit alpha code (i.e., SG for soil gas, VW for vapor well, and VC for vent cap) describing the type of sample source. This alpha code is followed by a three digit alpha numeric code which identifies the site number and whether it is a landfill gas probe location (designated L) or a gas migration perimeter probe (designated by a P). For example, a landfill probe for Site 15 would be designated as SG-15L. The analytical results summaries presented in Section 2.0 provide footnotes that identify the analytical results ID number and the corresponding field ID number for ease in reviewing the raw data tables in the appendices.

5.2 Individual Landfill, Vent Cap and Vapor Well Sample Results

This section contains detailed information about the 65 soil-gas probe samples and the 23 vapor well samples collected. Information included in each subsection includes site location, site description, number of samples taken, sample depths, soil gas characterization, daily precipitation data, and hand augering information. Figures 5-1 through 5-17 contain area maps and sample locations.

Soil probe samples were driven as close to the 6-foot (perimeter) or 8-foot (landfill) goal as possible; however, two conditions necessitated a shallower sample depth. The first is refusal of the probe by the underlying ground formations or site debris (a second attempt was made before a sample was taken). The second reason for a shallower sample depth was poor soil-gas migration indicated by a high vacuum at the vacuum pump. The probe was pulled up until the vacuum fell below the maximum 23 pounds per square inch (psi) to approximately 17 psi. The drop in the vacuum indicated a soil-gas flow

through the sampling probe; however, sometimes this vacuum reading would not drop until the probe had been pulled up one or more feet past the six- or eight-foot depth. The high vacuum conditions were caused by the tightly packed nature of the clay soils and in some instances, the presence of saturated conditions.

Landfill gas samples were all analyzed for methane, fixed gases (carbon dioxide, nitrogen, and oxygen), and the 10 specified air contaminant compounds listed in Table 1-1. Perimeter probes were also included in this full spectrum analysis, even though California Air Resources Board (ARB) guidelines allow for methane only to be sampled if the landfill samples have no detectable amounts of the compounds listed in Table 1-1. This more conservative approach was used in the event that a perimeter sample was located over a landfill, and to provide more complete information about any off-site soil-gas migration.

The analytical results for the probe, gas vent, and vapor well are presented in Tables 2-1 through 2-17. The quality control measures used for the project are described in Subsection 5.1.

5.2.1 Landfill Gas Testing Results for Site 7

Site 7 is located on the west side of the base, east of Building 701. The site is flat, except for a small mound of rubble in the center, and is covered with native vegetation. The site was previously used as a sludge and oil pit and measured approximately 380 feet by 93 feet by 23 feet deep. Samples of the waste showed low concentrations of a variety of VOCs, base/neutral and acid extractable compounds. One PCB was detected in one sample. Elevated concentrations of phenanthrene and Aroclor 1254 in composite waste samples were detected.

The landfill and gas migration testing locations for Site 7 are presented in Figure 5-1.

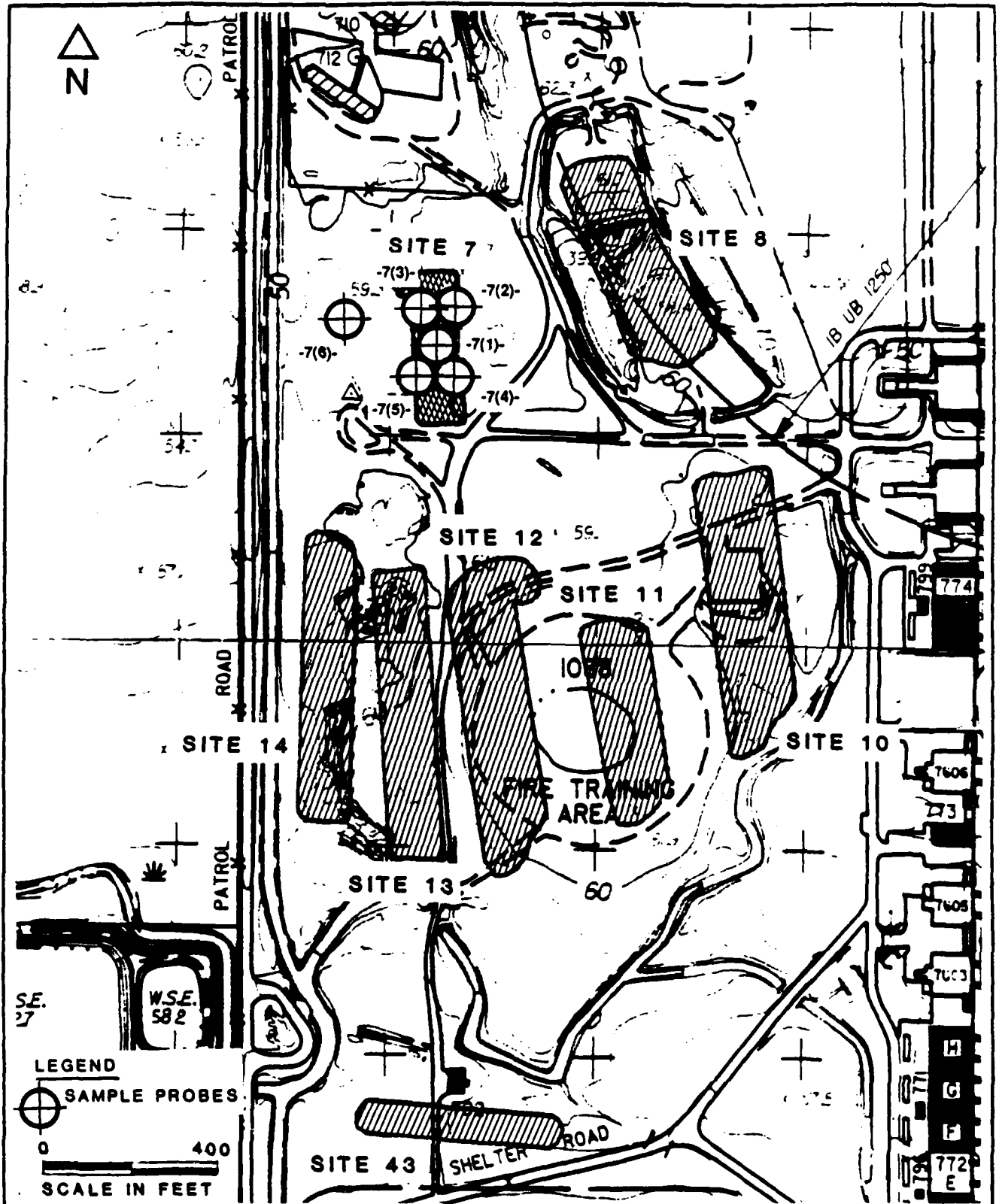


Figure 5-1. Sample Locations for Area C, Site 7 at McClellan AFB.

5.2.1.1 Samples

A total of six probes samples were taken at Site 7; five in the area of the landfill and one in the western perimeter.

As shown in Figure 5-1, the Site 7 samples are labeled 7(1) through 7(6). Probe depths ranged from two to eight feet; the two foot sample was from the perimeter probe and due to probe refusal. The cause for this probe refusal is thought to be a layer of shallow sandstone which the probes are unable to penetrate. Other sites in the area had similar problems at similar depths. This layer of sandstone was noted at Site 43.

Landfill and perimeter probe samples for Site 7 were all collected on December 4th and 5th. Rainfall had occurred in the 72 hours prior to December 4th and December 5th, and it rained both sampling days. Approximately 0.33 inches of precipitation occurred on the 4th, and a lighter precipitation of 0.01 inches fell on the 5th. The cumulative rainfall for the preceding 72 hours to December 4th was 0.41 inches, the cumulative rainfall for the preceding 72 hours to December 5th was 0.34 inches. In accordance with the sampling protocol for conditions where rainfall occurred during sampling or 72 hours prior to sampling, hand augers were used to bore and collect soil samples for inspection of soil moisture in the sampling areas on December 4th and 5th at Site 7; dry soil was found at 3 and 2 feet, respectively.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, are given in Table 2-1. Table 5-3 further summarizes the Table 2-1 results. Table 5-3 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other air contaminants tested below the limit of quantitation. It should be noted that the Site 7 perimeter sample is also part of a series of perimeter sample locations surrounding a cluster of seven sites. Sixteen perimeter samples were located to detect off-site gas migration at Sites 7, 8, 10, 11,

TABLE 5-3. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 7 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ ^b	Highest Concentration (ppbv) ^c	Number of Probes Above Average LOQ ^b	Highest Concentration (ppbv) ^c
Vinyl Chloride	5	2,000	0	0
Benzene	1	<2,000 ^d	0	0
Ethylene Dibromide	2	<5 ^d	0	0
Ethylene Dichloride	1	<200 ^d	0	0
Methylene Chloride	4	9,000	1	100
Perchloroethylene	5	300	0	0
Carbon Tetrachloride	2	<0.8 ^d	0	0
Methyl Chloroform	5	100	0	0
Trichloroethylene	5	400	1	1
Chloroform	3	4	0	0

^a Five landfill probes and one perimeter probe were sampled at this site. All analytical results are presented in Table 2-1, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

12, 13, and 14 as shown in Figure 5-2. It was felt that a greater number of perimeter probes around these sites could offset an inability to install landfill probes and still provide useful information for these three sites.

5.2.2 Landfill Gas Testing Results for Site 8

Site 8 is located on the west side of the base, 280 feet east of Site 7 and 700 feet northwest of Building 774. The site area is approximately 435 feet by 135 feet by 20 feet deep, and was previously a sludge and refuse landfill. Site 8 is covered by natural vegetation and some construction debris. A significant feature of this site is the large berm that encompasses the site, making some perimeter areas inaccessible. Historical soil samples of the waste showed very few VOCs, including benzene, toluene, trans-1,2-dichloroethylene, and acetone, up to 10 base/neutral compounds of which chrysene, phenanthrene, 3,4-benzofluoroanthene (560 ug/kg), dibenzo(a,h)anthracene (1,500 ug/kg), and indeno(1,2,3-cd)pyrene (1,200 ug/kg) were detected in elevated levels. No acid extractable compounds or pesticides and PCBs were detected. Elevated concentrations of oil and grease (300-6,170 ug/kg) and three heavy metals also were detected. All heavy metal concentrations were below total threshold limit concentration (TTL) values, as established by the California Department of Health Services (DOHS). Currently, the bermed area appears to be used as a military training ground.

An area map of Site 8, along with the sample probe locations, is presented in Figure 5-3.

A total of eight probe samples were taken at Site 8; five in the area of the landfill and three around the perimeter. As shown in Figure 5-3 the samples are labeled 8(1) through 8(8). Probe depths ranged from 4 to 8 feet; the eight-foot target depths were achieved on four of the probes as Table 2-2 indicates.

Landfill and perimeter probe samples for Site 8 were all collected on December 10th and 11th. Rainfall had occurred in the 72 hours prior to

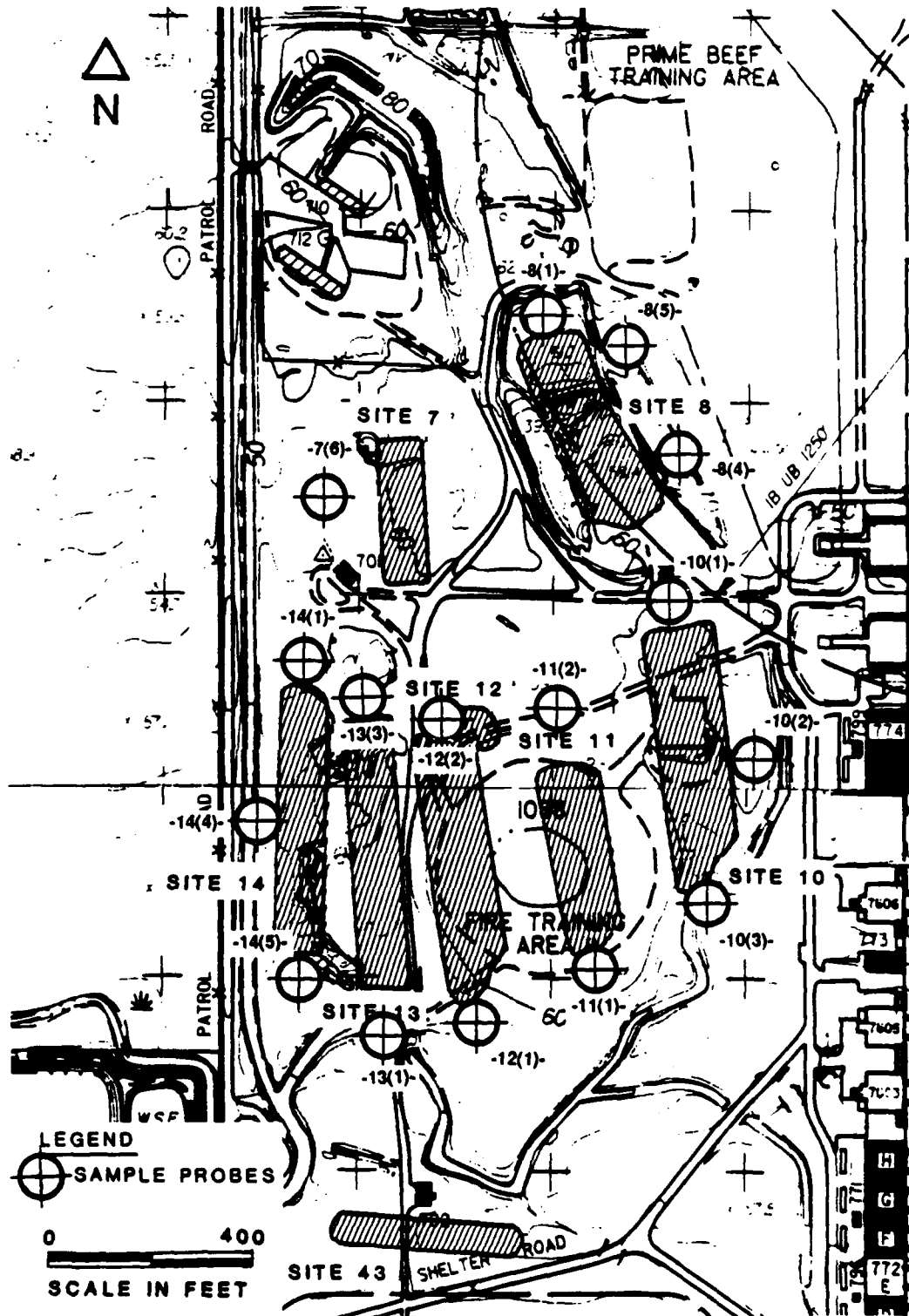


Figure 5-2. Sample Locations for Area C, Sites 7, 8, 10, 11, 12, 13, and 14 at McClellan AFB.

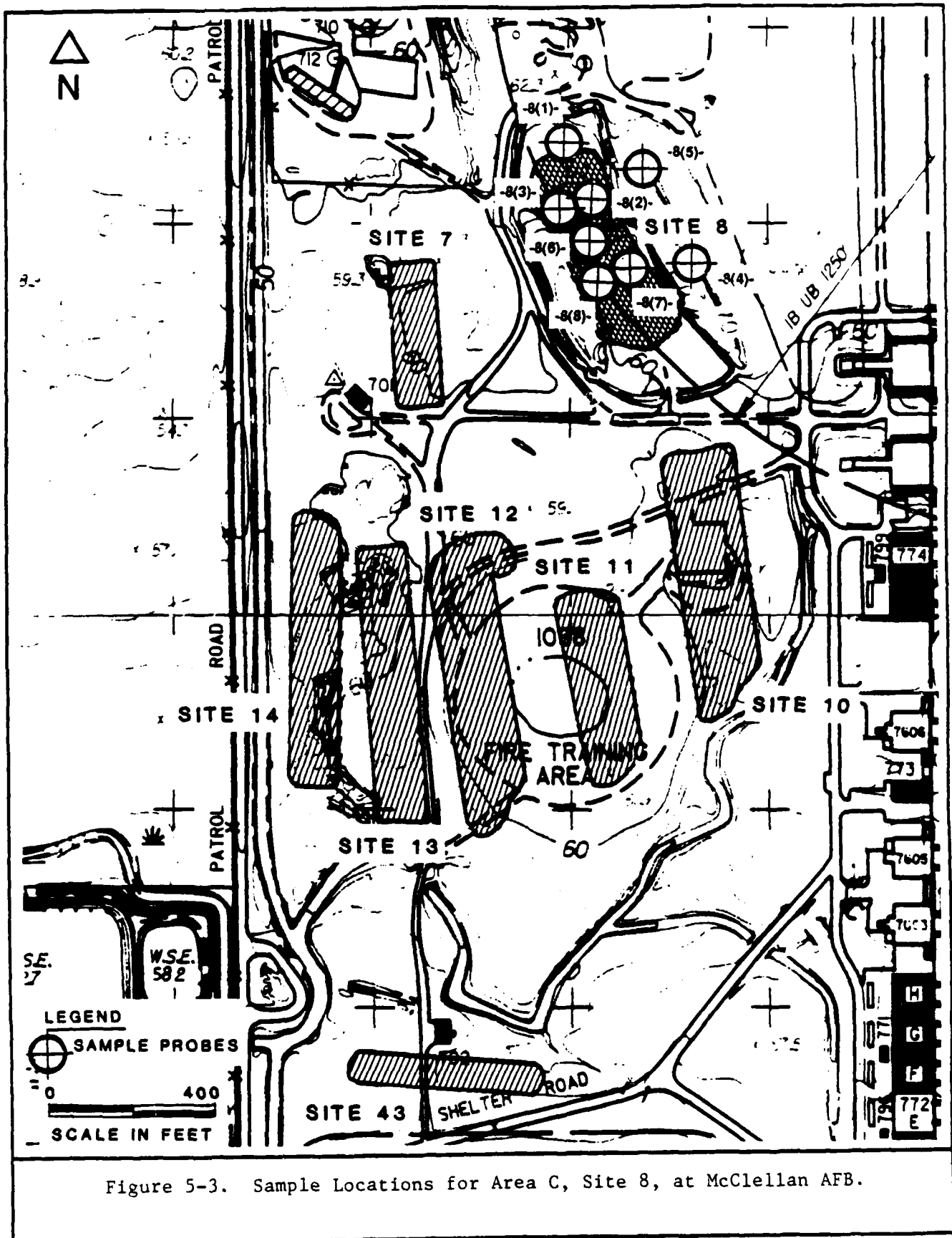


Figure 5-3. Sample Locations for Area C, Site 8, at McClellan AFB.

sampling, and trace rainfall occurred on December 10. Approximately 0.50 inches of precipitation occurred in the 72 hours prior to December 10, and 0.50 inches of precipitation had occurred prior to December 11. A hand auger sample was taken in Site 8 on December 7th prior to sampling and showed dry soil at 2.5 feet; and a hand auger on December 10th in Site 8 also showed dry soil at 3 feet. Since only trace rainfall occurred on December 11th, no repeat augering was performed on that day.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes are given in Table 2-2. Table 5-4 further summarizes the Table 2-2 results. Table 5-4 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.3 Landfill Gas Testing Results for Sites 10, 11, and 12

Sites 10, 11, and 12 are located near Site 7 and 8. These three sites are very close together and were studied as a group rather than discrete sites. Because the sites are close together, attempts to distinguish between them for this field investigation proved to be difficult or impossible.

Site 10 is located about 140 feet south of Site 8 on the west side of the base and is 500 feet west of Building 774 (see Figure 5-4). The site area is approximately 530 feet by 100 feet by 15 feet deep and was used as a solid waste landfill. It is covered by natural vegetation and some construction refuse. Historical soil samples collected from the area by McLaren Engineering contained a variety of compounds including 8 VOCs, 15 base/neutral compounds, 2 acid extractable compounds, 2 non-priority compounds, and one PCB. Elevated concentrations of chloroform (41-890 ug/kg), acenaphthene (140 ug/kg), anthracene (110 ug/kg), chrysene (400 ug/kg), fluorene (230 ug/kg), naphthalene (210 ug/kg), phenanthrene (500 ug/kg), pyrene (930 ug/kg) and Aroclor 1260 (PCB 1260) (1,490-150,000 ug/kg) were detected. The waste samples also showed a variety of heavy metals. Total concentrations of cadmium, copper, lead, and zinc were above DHS TLC values. Soluble concentrations of antimony, cadmium, copper, lead, and zinc were detected at

TABLE 5-4. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 8 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ	Highest Concentration ^c (ppbv)	Number of Probes ^b Above Average LOQ	Highest Concentration ^c (ppbv)
Vinyl Chloride	2	120,000	0	0
Benzene	1	2,000 ^d	1	200 ^d
Ethylene Dibromide	2	<4 ^d	1	<3 ^d
Ethylene Dichloride	1	<800 ^d	1	<200 ^d
Methylene Chloride	2	<900 ^d	1	<300 ^d
Perchloroethylene	5	7,000 ^d	3	200
Carbon Tetrachloride	2	<0.8 ^d	1	<0.5
Methyl Chloroform	5	10,000	3	20
Trichloroethylene	5	800 ^d	3	20 ^d
Chloroform	2	<8 ^d	1	<4 ^d

^a Five landfill probes and three perimeter probes were sampled at this site. All analytical results are presented in Table 2-2, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

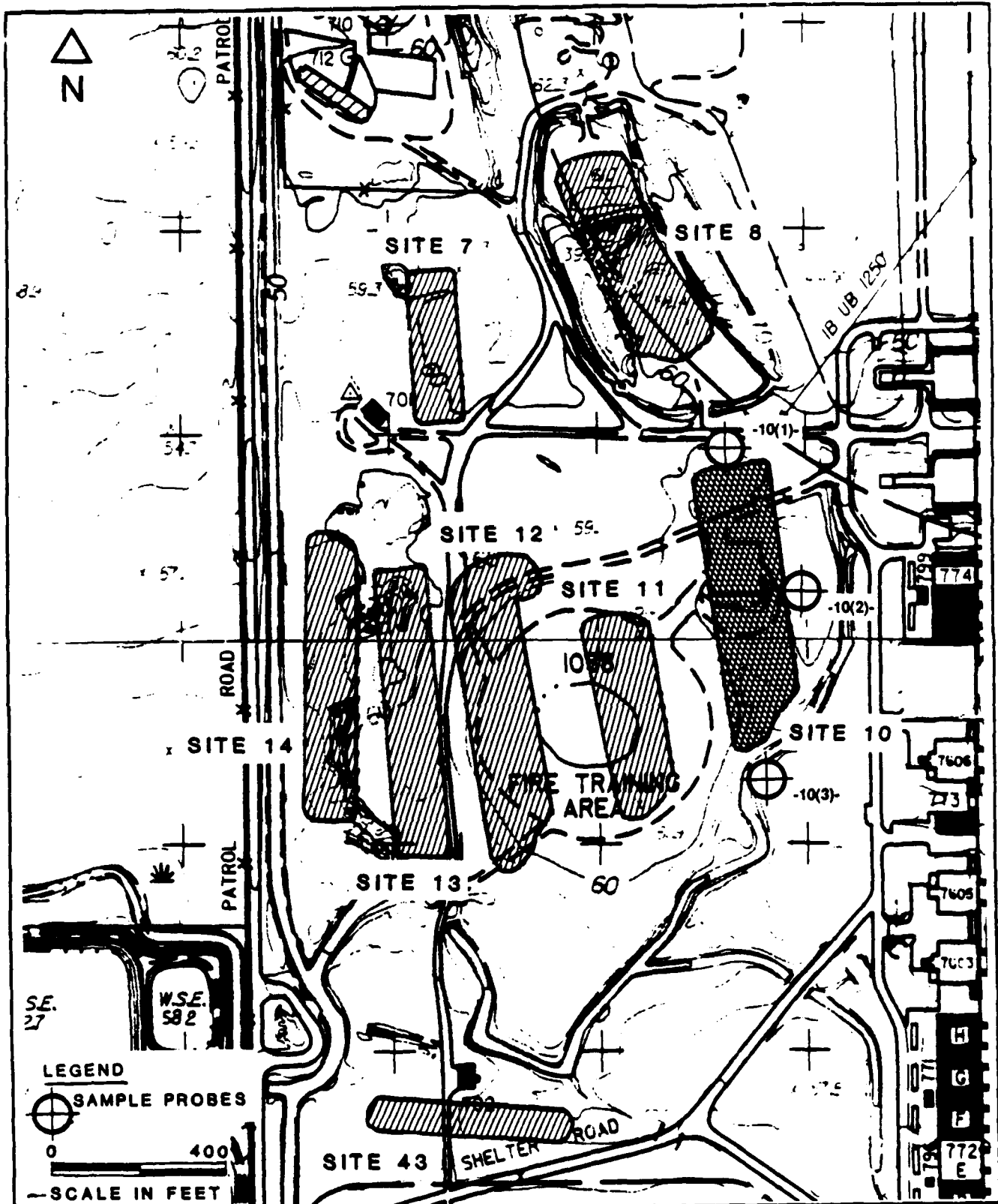


Figure 5-4. Sample Locations for Area C, Site 10, McClellan AFB.

concentrations above soluble threshold limit concentration (STLC) values, as established by DHS. Currently, a portion of Site 10 is being used as a secured storage area for low level contaminated soils.

Site 11 is located 90 feet west of Site 10 and 600 feet west of Building 774 (see Figure 5-5). The site area is 405 feet by 80 feet by 6 feet deep, and was previously used as a solid waste landfill. Currently, a large portion of this site is being used as a secured storage area for low-level contaminated soils. Historical soil samples collected from the area by McClaren Engineering contained low concentrations of VOCs, and a variety of acid extractable compounds, PCBs, base/neutral extractable compounds, and metals. VOCs detected included chloroform (53-140 ug/kg), chlorobenzene (190-380 ug/kg), and dichloromethane (260 ug/kg). Elevated concentrations of phenanthrene (370 ug/kg), fluorene (240 ug/kg), and pyrene (240 ug/kg) were detected. Oil and grease (220-6,430 mg/kg) and phenolic compounds were detected. Concentrations of total lead were above TTLC values. Concentrations of soluble lead were above STLC values. Concentrations of total and soluble chromium were above TTLC and STLC values for chromium VI but below TTLC and STLC values for chromium III.

Site 12 is located 90 feet west of Site 11 and 900 feet southwest of Building 774 (see Figure 5-6). The site area is 610 feet by 90 feet by 12 feet deep, and was previously used as a solid waste landfill. A large portion of Site 12 is also being used as a secured storage area for low-level contaminated soil. Historical site samples collected from the area by McLaren contained a variety of VOC and non-VOC compounds and heavy metals. Dichloromethane (methylene chloride) (200-210 ug/kg) was detected in and immediately below the waste at elevated concentrations. The waste samples also showed anthracene (5,900 ug/kg), benzo(a)anthracene (13,000 ug/kg), chrysene (12,000 ug/kg), fluoranthene (28,000 ug/kg), and fluorene (5,400 ug/kg) at elevated concentrations. Soluble lead was above STLC values. Analyses of soil samples from around the pit indicated little lateral migration from the pit, except possibly to the east where moderate levels of VOCs were detected. The compound 1,1-dichloroethylene (2,200 ug/kg) was detected in a boring to the east

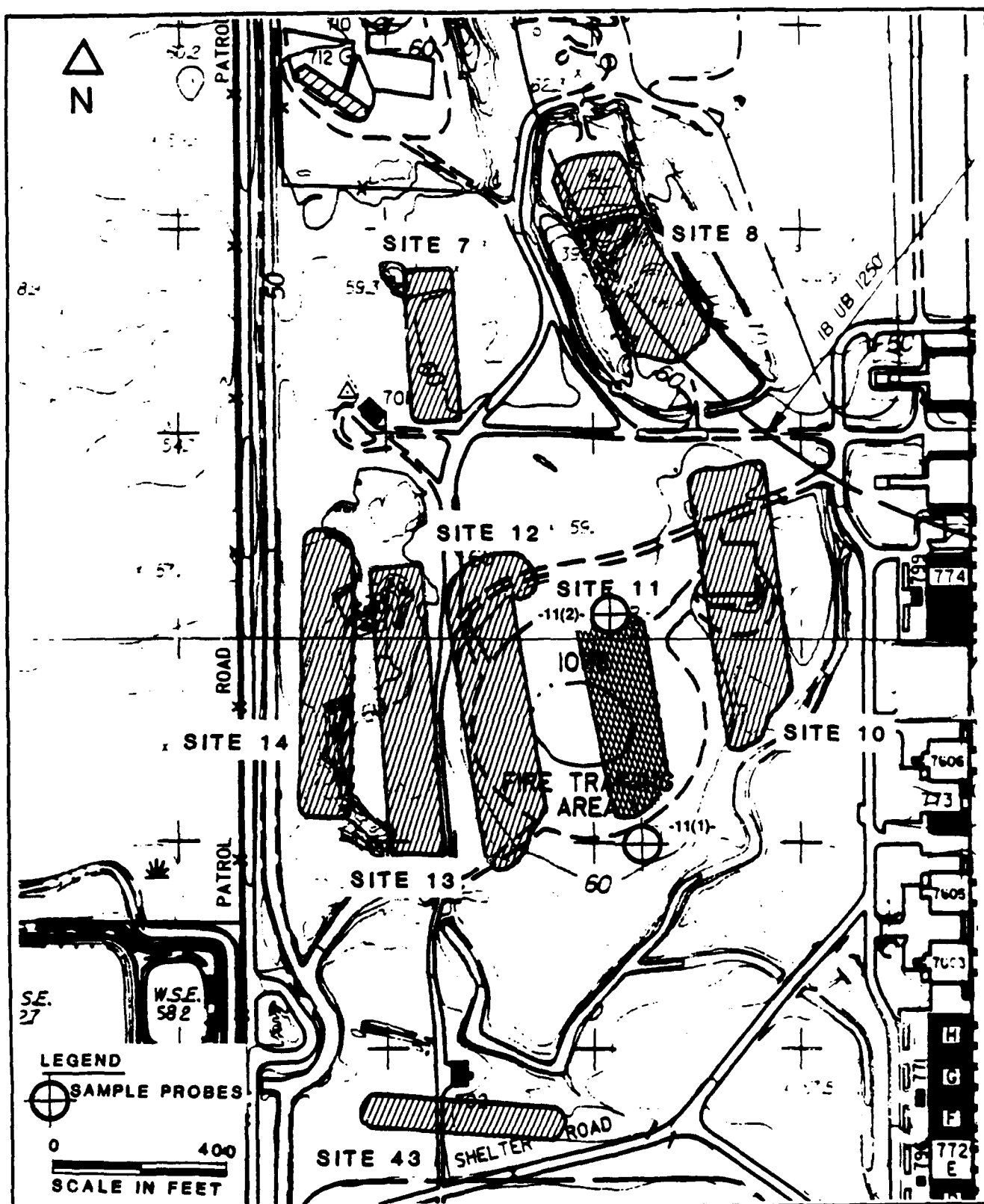


Figure 5-5. Sample Locations for Area C, Site 11, at McClellan AFB.

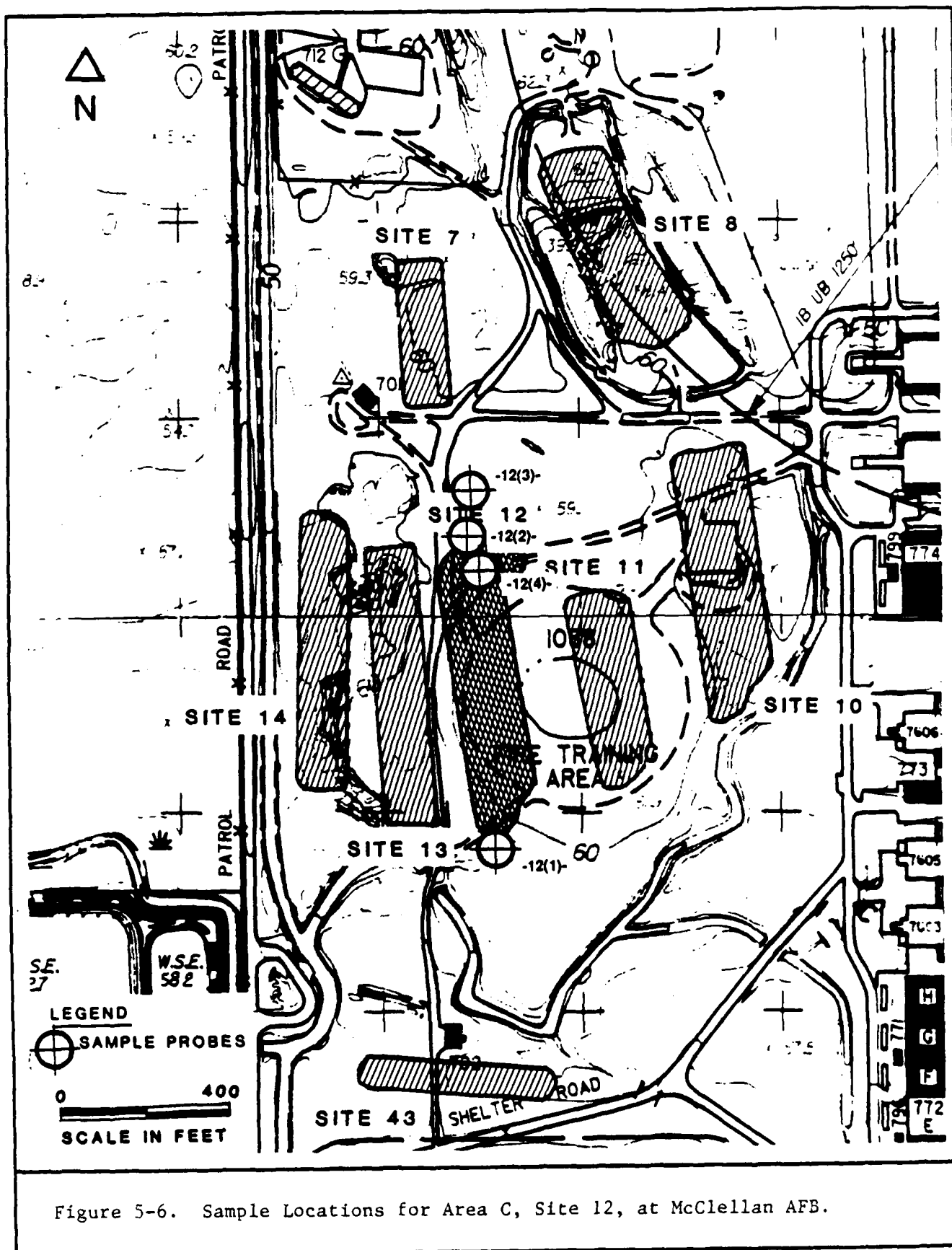


Figure 5-6. Sample Locations for Area C, Site 12, at McClellan AFB.

of the pit at elevated concentrations but was not detected in the waste. The soil sample borings indicated that the extent of the buried waste was wider than shown in the 1968 photograph. The actual width was approximately 90 feet.

Area maps for these three sites along with sample locations can be found in Figures 5-4 through 5-6. As Figures 5-4 through 5-6 show, Sites 10, 11, and 12 consisted of perimeter probe samples only. Landfill samples were not collected because of access problems to the landfill areas. Portions of each of these sites are being used as a secured storage area for low-level contaminated soils. A total of nine perimeter probe samples were placed around the site; two extra probes were placed at the north end of Site 12 since the probe 12(2) showed elevated levels of vinyl chloride and benzene. The probe samples are labeled 10(1) through 10(3) 11(1) and 11(2); and 12(1) through 12(4).

Perimeter probe depths ranged from 2 to 6 feet. Shallow probe depths resulted when the probes encountered a sandstone formation. This sandstone formation was also encountered during probe installation at nearby sites.

Probe samples for these three sites were collected on December 5, 7, and 15. Rainfall occurred within a 72-hour period prior to sampling on December 5 and December 7. Rainfall occurred on December 15. A light precipitation of 0.01 inches occurred on December 5 and a cumulative 0.39 inches of rainfall occurred in the 72 hours prior to December 5. Approximately 0.88 inches of precipitation had occurred in a 72-hour period prior to December 7. Approximately 0.05 inches of rainfall was recorded on December 15. No rainfall had occurred in the previous 72 hours to December 15. Hand augers were used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling areas. Hand auger samples were collected on December 5 at Site 7. Dry soil was noted at a 2-foot depth. Hand auger samples were also taken on December 7 between Sites 11 and 12. Dry soil was noted at a 3-foot depth.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Sites 10, 11, and 12 are given in Tables 2-3, 2-4, and 2-5. Tables 5-5, 5-6 and 5-7 further summarize the Table 2-4 through 2-6 results. Tables 5-5 through 5-7 each presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1 for Sites 10, 11, and 12, respectively. All other tested air contaminants were below the limit of quantitation.

5.2.4 Landfill Gas Testing Results For Sites 13 and 14

Site 13 is located 20 feet west of Site 12 and 1,000 feet west of Building 774 (see Figure 5-7). The site area is 600 feet by 90 feet by 15 feet deep, and was previously used as a solid waste landfill. Site 13 is divided by an asphalt road that leads to Sites 7 and 9. Historical site samples collected from the area by McLaren contained metal pieces, wood, burlap, plastic, paper, and carbonaceous (burned) material. Releases of an unknown gas were observed while drilling the cased borings. The first cased boring was terminated. The gas from the second cased boring was sampled twice, and analyses showed the gas was predominantly methane. Composite analyses of the waste showed low to high concentrations of VOCs, including acetone and 2-butanone above 40,000 ug/kg. Dichloromethane (27-96 ug/kg) was also detected. These samples also showed a variety of base/neutral and acid extractable, non-priority, pesticide, and PCB compounds. Elevated concentrations of acenaphthene (100 ug/kg), chrysene (170 ug/kg), phenanthrene (190 ug/kg), pyrene (150 ug/kg), n-nitrosodiphenylamine (220 ug/kg), chlordane (720 ug/kg), and PCB 1260 (1,000-1,800 ug/kg) were detected.

Site 14 is located 90 feet west of Site 13, adjacent to Patrol Road and south of Building 701 (see Figure 5-8). The site area is approximately 600 feet by 90 feet by 14 feet deep, and was previously used as a solid waste landfill. Site 14 is covered by grass and natural vegetation; a large, 15-foot high mound of soil covers the length of the site. Historical soil samples collected from the area by McLaren contained buried burn debris

TABLE 5-5. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 10 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ	Highest Concentration ^c (ppbv)	Number of Probes ^b Above Average LOQ	Highest Concentration ^c (ppbv)
Carbon Tetrachloride	d	d	1	0.1

^a One landfill probe and three perimeter probes were sampled at this site. All analytical results are presented in Table 2-3 including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d Site conditions prohibited collection of samples.

TABLE 5-6. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 11 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ ^b	Highest Concentration (ppbv) ^c	Number of Probes Above Average LOQ ^b	Highest Concentration (ppbv) ^c
Perchloroethylene	d	d	1	3
Methylene Chloroform	d	d	1	0.6
Trichloroethylene	d	d	1	4

^a No landfill probes and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-4, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d Site conditions prohibited collection of samples.

TABLE 5-7. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 12 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ ^c	Highest Concentration ^c (ppbv)	Number of Probes ^b Above Average LOQ ^c	Highest Concentration ^c (ppbv)
Vir Chloride	d	d	3	56,000
Benzene	d	d	4	32,000
Ethylene Dibromide	d	d	2	<4 ^a
Ethylene Dichloride	d	d	2	<500 ^e
Methylene Chloride	d	d	3	1,000
Perchloroethylene	d	d	4	4,000
Carbon Tetrachloride	d	d	2	60
Methyl Chloroform	d	d	4	80
Trichloroethylene	d	d	4	8,000
Chloroform	d	d	2	2,000

^a No landfill probes and four perimeter probes were sampled at this site. All analytical results are presented in Table 2-5, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d Site conditions prohibited collection of samples.

^e This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

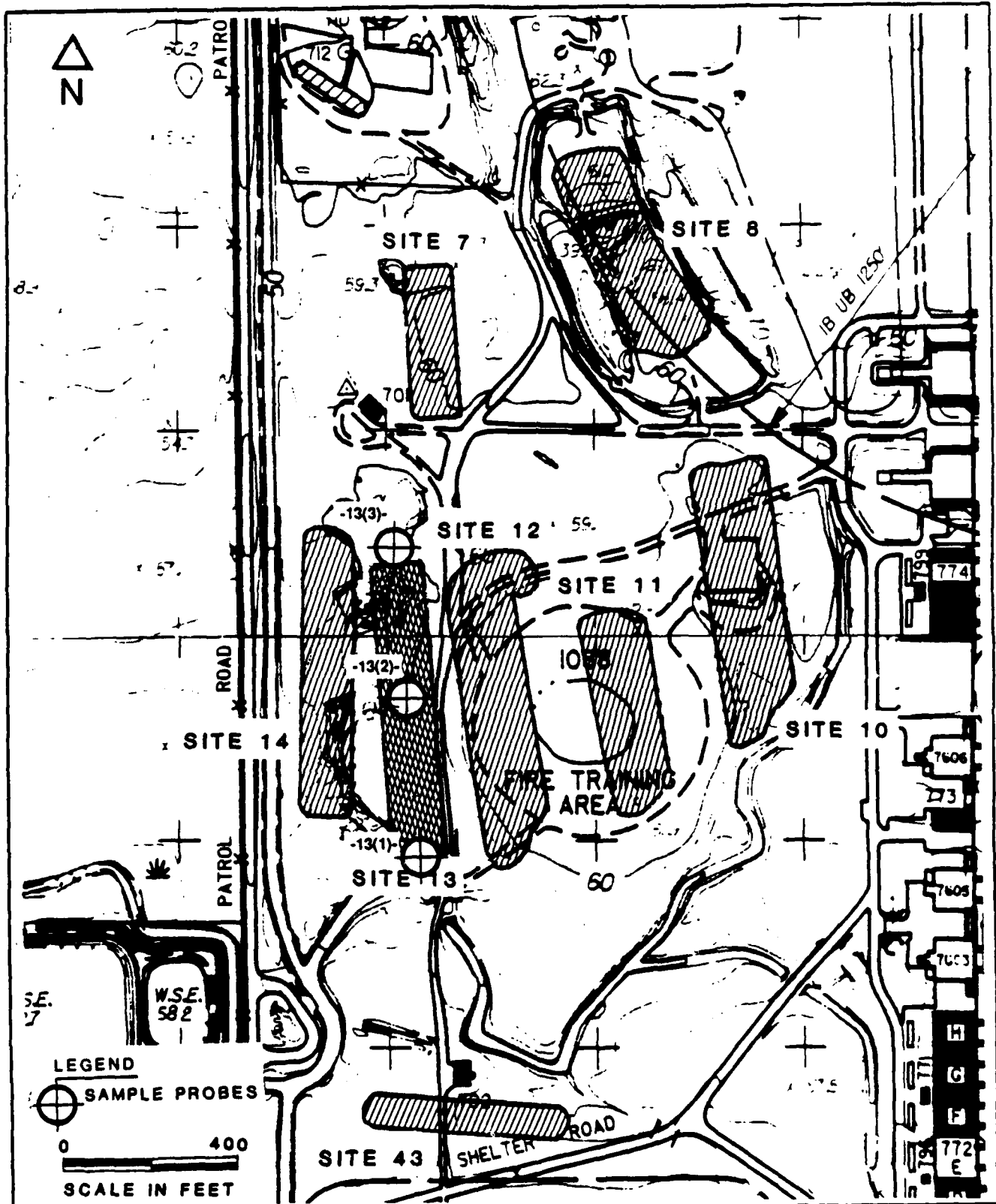


Figure 5-7. Sample Locations for Area C, Site 13, at McClellan AFB.

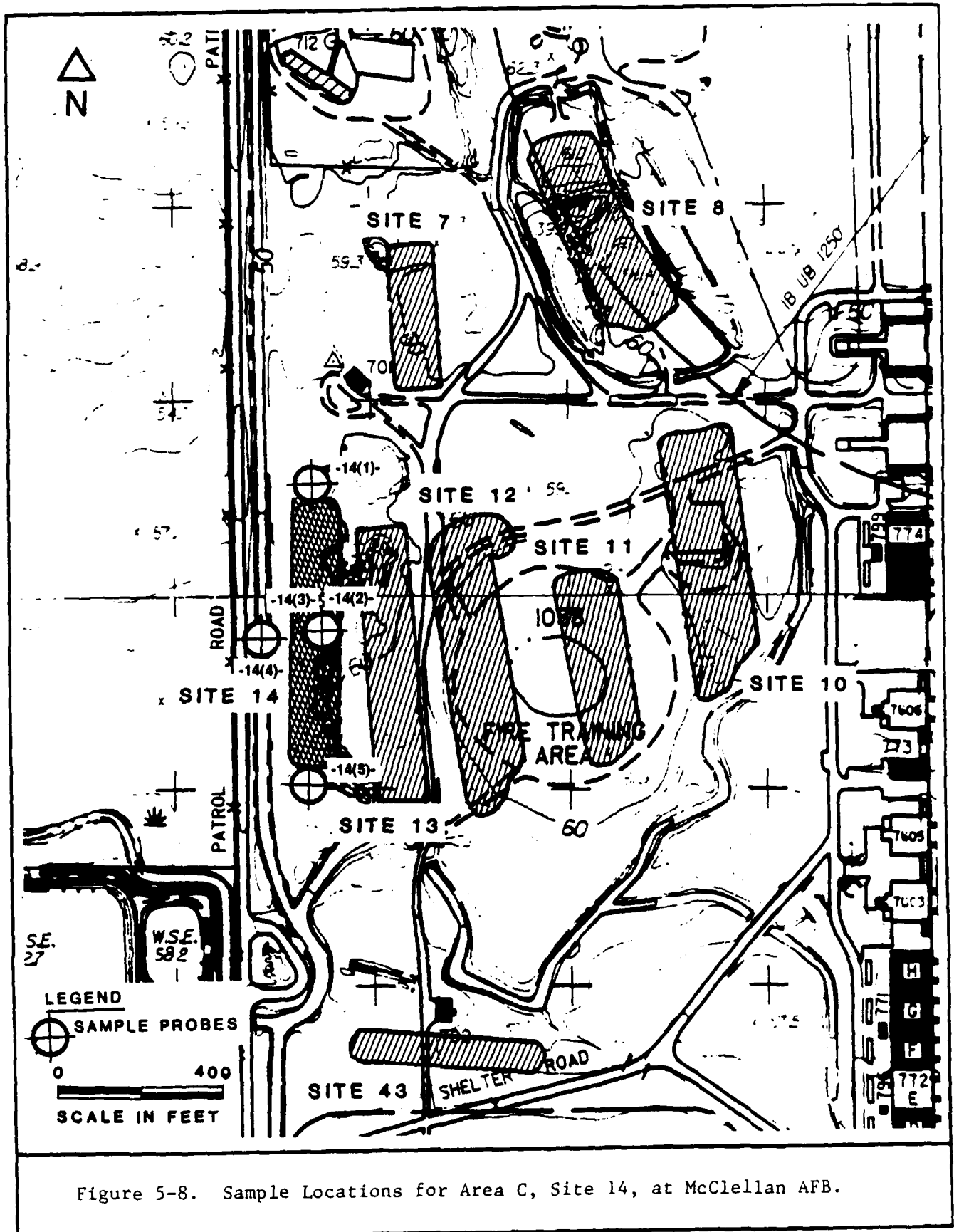


Figure 5-8. Sample Locations for Area C, Site 14, at McClellan AFB.

consisting of metal, glass, wood, cloth, paper, and vegetative debris. Composite analyses of the waste showed low concentrations of VOCs and a variety of non-VOC compounds. VOCs detected included dichloromethane (48-140 ug/kg), toluene (22-43 ug/kg), and chlorobenzene (13-46 ug/kg). Elevated concentrations of acenaphthene (210 ug/kg), anthracene (150 ug/kg), fluorene (300 ug/kg), phenanthrene (1,300 ug/kg), and pyrene (240 ug/kg) were detected. A concentration of total mercury was above TTLC values, and concentrations of soluble cadmium and soluble lead were above STLC values.

Sites 13 and 14 had a total of 8 soil gas probe samples collected. Three were located in the landfill area and five at the perimeter. The samples are designated as 13(1) through 13(3) and 14(1) through 14(5), an extra landfill sample was taken in an attempt to reach the target sampling depth of 8 feet. Sample depths ranged from 5 to 8 feet; three of the eight samples reached the target sampling depths. The landfill and perimeter probe samples were collected on December 2, 3, and 4 for these sites.

Rainfall occurred on two of the three sampling days. Rainfall had occurred 72 hours prior to each of the sampling days. Approximately 0.06 inches of precipitation occurred on December 2. In the 72 hours prior to December 2, 1.7 inches of rain occurred. No rain fell on December 3, but approximately 1.7 inches of rain had fallen within the previous 72 hours. Approximately 0.33 inches of rain fell on December 4. In the 72 hours prior to December 4, 0.41 inches of rain had occurred.

Hand augers were used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling areas. Hand auger samples were collected on December 4 at Sites 13 and 14. Dry soil was noted at a depth of 2 feet in Site 13 and at a depth of 1.5 feet in Site 14.

The analytical results for Sites 13 and 14 for gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, are given in Table 2-6 and 2-7. Tables 5-8 and 5-9 further

TABLE 5-8. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 13 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ ^c	Highest Concentration (ppbv) ^c	Number of Probes ^b Above Average LOQ ^c	Highest Concentration (ppbv) ^c
Vinyl Chloride	0	0 ^d	1	5,000
Benzene	1	<200 ^d	2	600
Methylene Chloride	0	0	1	200
Perchloroethylene	0	0	2	6
Methyl Chloroform	0	0	2	4
Trichloroethylene	1	1	2	40

^a One landfill probe and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-6, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

TABLE 5-9. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 14 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ	Highest Concentration [ppbv] ^c	Number of Probes ^b Above Average LOQ	Highest Concentration [ppbv] ^c
Benzene	0	0	2	<60 ^d
Methylene Chloride	1	100	0	0
Perchloroethylene	1	10	0	0
Methyl Chloroform	1	4	1	0.8
Trichloroethylene	1	2	0	0
Chloroform	1	40	0	0

^a Two landfill probes and three perimeter probes were sampled at this site. All analytical results are presented in Table 2-7, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

summarize the Table 2-6 and 2-7 results. Tables 5-8 and 5-9 each present the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1 for Sites 13 and 14, respectively. All other tested air contaminants were below the limit of quantitation.

5.2.5 Landfill Gas Testing Results for Site 22

Site 22 is located on the west side of the base, 140 feet east of Patrol Road and south of Waste Treatment Plant Aeration Basin. The site area is approximately 400 feet by 100 feet. Previously it was used as a burn pit and solid waste landfill. Site 22 and the surrounding area are being used to store construction materials. For the most part, the site is flat and covered with bare soil. Historical soil samples collected from this area by McLaren contained metal and wire pieces, concrete and asphalt, rubble, burned wood, glass, rubber, and sludge-like material. Composite analyses of the waste showed low to high concentrations of VOC and non-VOC compounds and elevated concentrations of heavy metals. Elevated concentrations of 13 base/neutral compounds and one PCB was detected. Base/neutral compounds included fluorene (170-510 ug/kg), acenaphthene (130-340 ug/kg), and phenanthrene (160-3,200 ug/kg). Total lead exceeded the TTLC value, and soluble antimony exceeded the STLC value. Oil and grease concentrations in the waste ranged from 2,910 mg/kg to 27,000 mg/kg.

Soil sample borings were drilled around the burn pit to characterize lateral migration from the site. These borings showed moderate to high concentrations to 80 feet. Analyses of soil samples around the pit showed a variety of volatile organic and nonvolatile organic compounds. Trichloroethylene was detected in all three borings at concentrations ranging from 55 to 4,600 ug/kg. Elevated concentrations from one to three base/neutral extractable compounds were detected. The results indicated significant lateral migration of contaminants, including chlorobenzene (23-6,600 ug/kg), ethylbenzene, TCE, toluene (12-5,200 ug/kg), total xylenes (380-31,000 ug/kg), acenaphthene (130-340 ug/kg), fluorene (170-510 ug/kg), phenanthrene

(160-3,200 ug/kg), and 2-methylnaphthalene. An area map with the sample locations and site area can be found in Figure 5-9.

A total of five probe samples were analyzed at Site 22, four samples were taken from inside the landfill area, and one taken at the west perimeter.

Five landfill samples originally were proposed for Site 22. The presence of surface water at the southeast end of the site resulted in a modification to the sampling strategy. Four landfill probe samples and one perimeter probe were sampled. The sampling depths ranged from 5 to 8 feet.

Landfill and perimeter probes were collected for Site 22 on December 10. A trace of rain occurred on that day. In the 72 hours prior to December 10, approximately 0.50 inches of rain occurred. Because Site 22 is covered with packed gravel, the Site 22 sampling area could not be hand augered to collect soil samples to inspect the soil moisture conditions at depth. Instead, soil conditions were estimated by collecting a hand auger sample at Site 8 the same day. The Site 8 hand auger sample indicated dry soil conditions at a 3-foot depth.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Site 22, are given in Table 2-8. Table 5-10 further summarizes the Table 2-8 results. Table 5-10 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below LOQ.

5.2.6 Landfill Gas Testing Results for Site 24

Site 24 is located approximately 900 feet east of Building 621 at the southern end of the base. The site area is approximately 515 feet by 80 feet by 11 feet deep. It was previously used as a solid waste landfill.

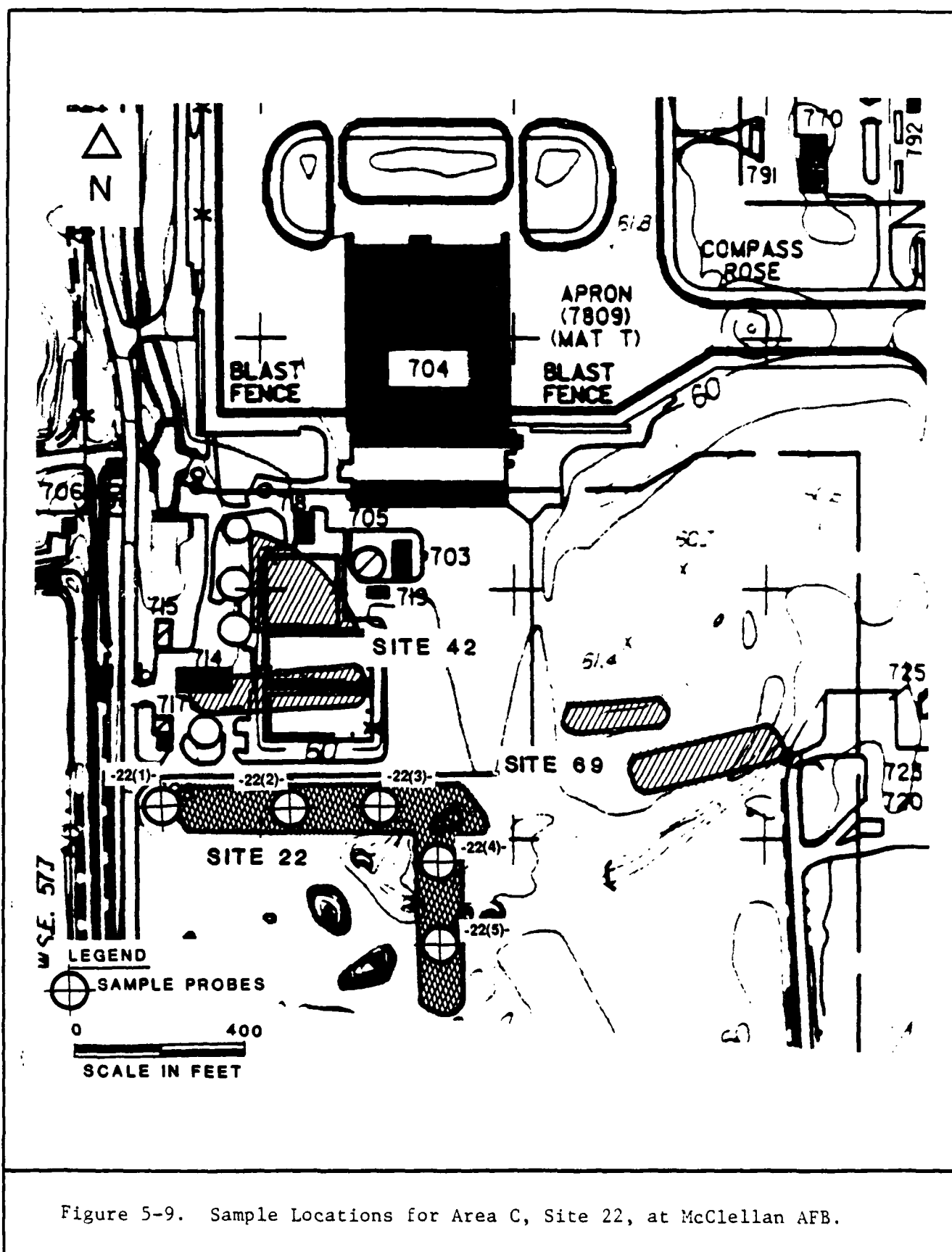


Figure 5-9. Sample Locations for Area C, Site 22, at McClellan AFB.

TABLE 5-10. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 22 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ	Highest Concentration (ppbv) ^c	Number of Probes ^b Above Average LOQ	Highest Concentration (ppbv) ^c
Vinyl Chloride	1	4,000	0	0
Perchloroethylene	3	30	1	6
Methyl Chloroform	3	4	1	8
Trichloroethylene	4	400	1	400

^a Four landfill probes and one perimeter probe were sampled at this site. All analytical results are presented in Table 2-8, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

The site is partially covered by a drainage ditch and an asphalt parking lot. The remainder of the site is covered by native vegetation and is not currently in use. Historical soil samples collected from the area by McLaren contained low concentrations of three VOCs. One composite waste sample showed concentrations of four base/neutral extractable compounds and one acid extractable compound. An elevated concentrations of benzo(a)pyrene (1,200 ug/kg) was detected in this sample. Elevated total concentrations of five heavy metals were detected in composite waste samples. Total lead in one composite waste sample exceeded the DHS TLIC.

Figure 5-10 shows the area around the landfill, the landfill and the probe locations.

A total of six probe samples were taken in the area of Site 24. Four probe samples were taken inside the landfill area and two were taken at the perimeter. The samples are labeled 24(1) through 24(6). The sample depths ranged from 2 to 8 feet; eight-foot sampling depths were reached on three of the six samples.

Landfill and perimeter probe samples were collected for Site 24 on December 14. No precipitation occurred on the sampling day or in the 72-hour period prior to December 14.

A hand auger was used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling area. Hand auger samples collected on December 14 showed dry soil conditions at the 3-foot depth.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Site 24, are given in Table 2-9. Table 5-11 further summarizes the Table 2-9 results. Table 5-11 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

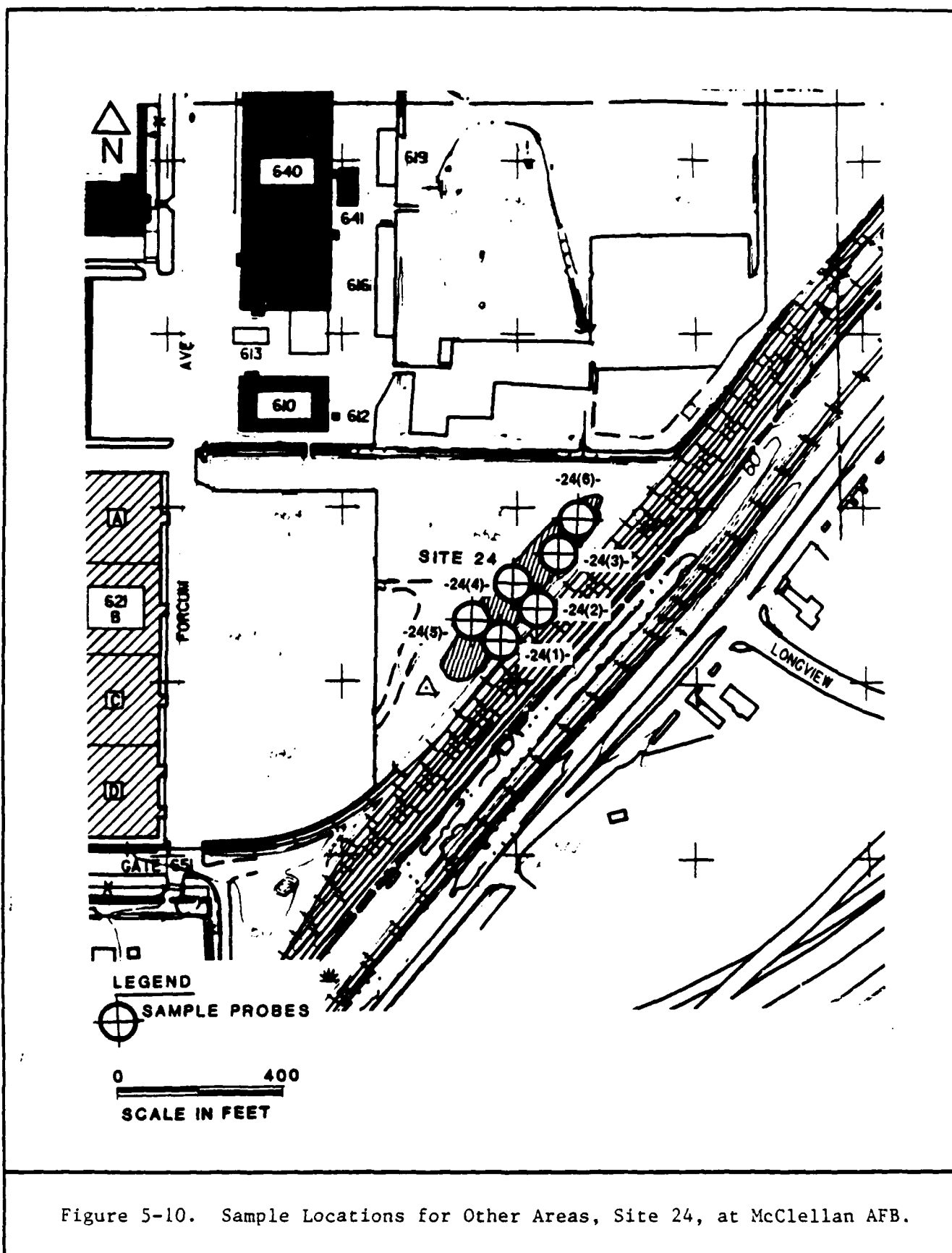


TABLE 5-11. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 24 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ	Highest Concentration (ppbv) ^c	Number of Probes ^b Above Average LOQ	Highest Concentration (ppbv) ^c
Perchloroethylene	1	3	2	4
Carbon Tetrachloride	0	0	1	0.2
Methyl Chloroform	4	200	2	2
Trichloroethylene	4	80	2	20

^a Four landfill probes and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-9, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

5.2.7 Landfill Gas Testing Results for Site 38

Site 38 is located in the southeast corner of the base under Building 475. The site was previously used as a sludge landfill, which also contained underground storage tanks. It measured approximately 600 feet long by 400 feet wide. The landfill currently is beneath an aircraft engine shop. The major features of the area include buildings 475, 473, and 429, which cover about 70 percent of the landfill area. Historical soil samples collected by McLaren, contained VOCs in soil samples from eight borings. Base/neutral compounds were detected in soil samples from seven borings. Non-priority pollutant compounds were detected in one boring. Elevated concentrations of total heavy metals were detected in two borings. Elevated concentrations of oil and grease were detected in two borings.

The sample from 9 feet in one boring contained concentrations of 13 VOCs ranging from 180 ug/kg for chloroform to 430,000 ug/kg for total xylenes. Chlorobenzene, ethylbenzene, toluene, 2-butanone, 2-hexanone, 4-methyl-2-pentanone, and total xylenes were detected at concentrations over 10,000 ug/kg. This sample also showed concentrations of four base/neutral extractable compounds ranging from 130 ug/kg for phenanthrene to 230 ug/kg for dinitrotoluene, and concentrations of four non-priority pollutant compounds ranging from 100 ug/kg for dibenzofuran to 580 ug/kg for 2-methylnaphthalene. Oil and grease were detected at a concentrations of 540 mg/kg.

Sampling of the headspace over auger boring cuttings with an HNu instrument and at borehole locations indicated low readings (<10 ppm) in 12 borings, moderate (10-100 ppm) in six borings, and high (>100 ppm) in two borings.

HNu cutting and headspace readings varied from less than 10 to 300 ppm. Strong odors were noted in six borings. Discolored soil was observed near the surface in six borings.

Figure 5-11 contains an area map, the landfill boundaries and the soil probe locations. The eight-foot sampling target depth was reached on one probe only; the range of probe depths was 2 to 6 feet. Two perimeter probes 38(6) and 38(7) were driven to 3 feet. Water was encountered at this depth and was sucked into the vacuum pump which prevented sampling at these perimeter locations.

Landfill probe samples were collected for Site 38 on December 11. No precipitation occurred on the sampling day; however, in the 72 hours prior to December 11, approximately 0.50 inches plus a "trace" of rain had fallen. Site 38 is covered by asphalt, concrete and/or gravel-packed parking lots. No hand auger samples were taken to determine the soil moisture conditions at depth prior to collecting landfill and perimeter probe samples.

The analytical results for gas characterization sampling, using landfill probes, for Site 38, is given in Table 2-10. Table 5-12 further summarizes the Table 2-10 results. Table 5-12 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.8 Landfill Gas Testing Results for Site 42

Site 42 is located 140 feet north of Site 22 under the Waste Treatment Plant on the west side of the base. Site 42 is approximately 210 feet by 50 feet by 6 feet deep. Previously it was used as an oil storage area and solid waste landfill. Historical soil samples collected from the area by McLaren contained low to high concentrations of VOCs, elevated levels of chloroform, and low concentrations of base/neutral extractable compounds. PCB 1254 was detected in one sample at an elevated concentration.

The burn pit at Site 42 was found to contain buried debris consisting of burnt debris, wood, plastic, and metal fragments. Analysis of the waste showed low to moderate concentrations of VOCs and non-VOCs. Elevated

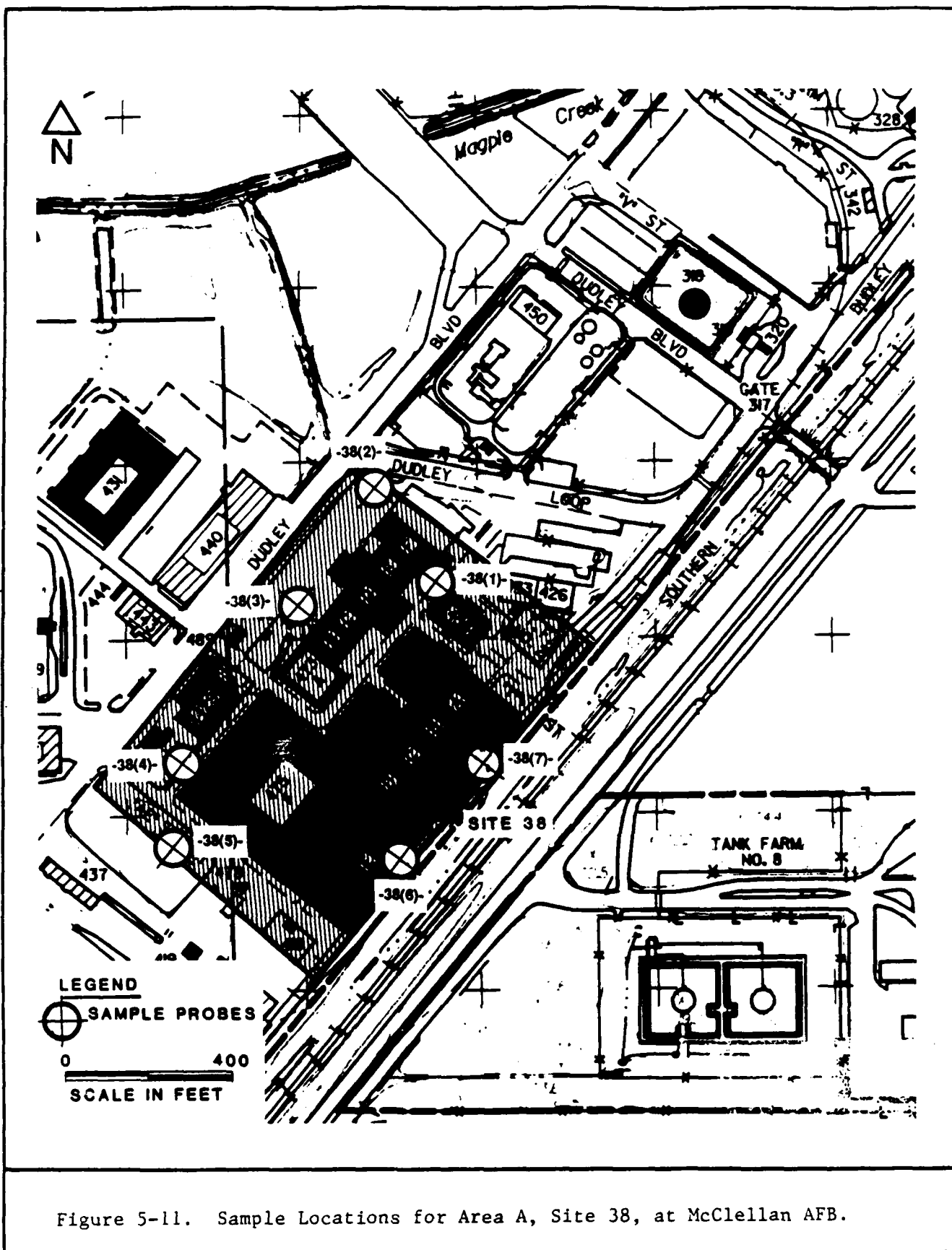


Figure 5-11. Sample Locations for Area A, Site 38, at McClellan AFB.

TABLE 5-12. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 38 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ	Highest Concentration (ppbv) ^c	Number of Probes ^b Above Average LOQ	Highest Concentration (ppbv) ^c
Vinyl Chloride	2	<200 ^d	8	8
Benzene	2	<80 ^d	8	8
Ethylene Dibromide	2	<0.5 ^d	8	8
Ethylene Dichloride	2	<80 ^d	8	8
Methylene Chloride	2	<100 ^d	8	8
Perchloroethylene	3	300	8	8
Carbon Tetrachloride	1	8	8	8
Methyl Chloroform	4	100	8	8
Trichloroethylene	4	100	8	8

^a Four landfill probes and no perimeter probes were sampled at this site. All analytical results are presented in Table 2-10, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

^e Site conditions prohibited collection of samples.

concentrations of phenanthrene was detected. Elevated concentrations of oil and grease and heavy metals also were detected, including total copper above TTLC values, and soluble cadmium and soluble lead above STLC values.

Analyses of soil samples from around Site 42 detected a variety of VOC and non-VOC compounds. VOCs detected in shallow soils include trichloroethylene (640-5,400 ug/kg) and trans-1,2-dichloroethylene (880-3,400 ug/kg). One soil sample boring to the southeast of the Site 42 oil storage ponds showed a number of VOC and non-VOC compounds, of which elevated concentrations of acenaphthylene (150 ug/kg), fluorene (240-560 ug/kg), and phenanthrene (160-520 ug/kg) were detected.

Figure 5-12 is an area map of the landfill location and the sample points 42(1) through 42(4). A total of four probe samples were taken; one landfill probe and three perimeter probes. Probe sample depths ranged from 3 to 6 feet with refusal on all but one sample, possibly due to subsurface construction material.

Landfill and perimeter probe samples were collected for Site 42 on December 11. No precipitation occurred on the sampling day; however in the 72 hours prior to December 11, approximately 0.50 inches plus a "trace" of rain had fallen. Site 42 is a covered site. No hand auger samples were taken to determine the soil moisture conditions at depth prior to collecting landfill and perimeter probe samples.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, are given in Table 2-12. Table 5-13 further summarizes the Table 2-12 results. Table 5-13 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

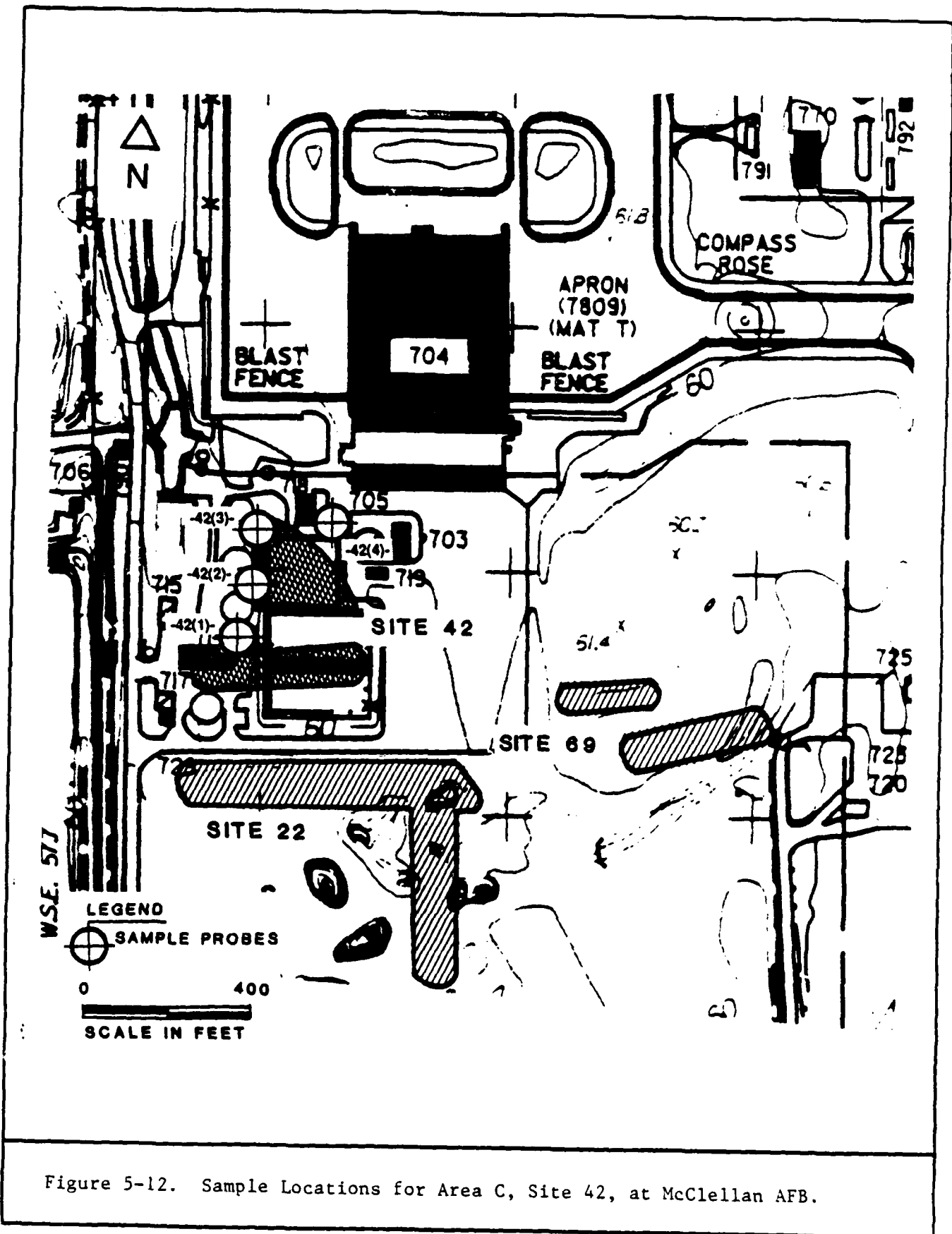


TABLE 5-13. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 42 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ	Highest Concentration (ppbv) ^c	Number of Probes ^b Above Average LOQ	Highest Concentration (ppbv) ^c
Vinyl Chloride	2	<200 ^d	e	e
Benzene	2	<60 ^d	e	e
Ethylene Dibromide	2	<0.5 ^d	e	e
Ethylene Dichloride	2	<80 ^d	e	e
Methylene Chloride	2	<100 ^d	e	e
Perchloroethylene	5	30	e	e
Methyl Chloroform	4	200	e	e
Trichloroethylene	5	3,000	e	e

^a Five landfill probes and no perimeter probes were sampled at this site. All analytical results are presented in Table 2-11, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

^e Site conditions prohibited collection of samples.

5.2.9 Landfill Gas Testing Results for Site 43

Site 43 is located on the west side of the base, 800 feet south of Site 13 and 600 feet northwest from Building 704. The site area is approximately 405 feet by 50 feet by 10 feet deep. Previously it was used as a solid waste landfill. Some construction rubble is lying over the site. Historical soil samples collected from the area by McLaren Engineering contained burned wood, metal pieces, wire, glass, and plastic. Most of the waste appeared burned. Analyses of the waste showed a variety of VOCs. Also detected were a number of base/neutral extractable compounds, of which acenaphthene (370 ug/kg), benzo(a)anthracene (130-1,100 ug/kg), chrysene (260-1,500 ug/kg), 2,4-dinitrotoluene (1,000 ug/kg), fluorene (380-460 ug/kg), nitrobenzene (750 ug/kg), and phenanthrene (1,400-1,800 ug/kg) were detected at elevated levels. A number of other non-VOC compounds were detected, including PCB 1254 in one boring at 4,600 ug/kg. Also, elevated concentrations of oil and grease up to 17,000 mg/kg and heavy metals were detected. Concentrations of total cadmium and total lead were above TTLC values. Concentrations of soluble cadmium and soluble lead were above STLC values.

Figure 5-13 contains an area map, reflecting the landfill area and sample locations 43(1) through 43(6).

A total of six probes were taken; three landfill and three perimeter. The depth of the probes ranged 4 to 7 feet. During installation, all of the probes had refusal problems from what appeared to be sandstone a few feet below the surface.

Landfill and perimeter probe samples were collected for Site 43 on December 7. No precipitation occurred on the sampling day, but, in the 72-hour period prior to sampling, approximately 0.88 inches of rain had fallen. Hand augers were used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling area. Hand auger samples were collected on December 7 on the western portion of Site 43. They showed dry soil conditions at a 2-foot depth.

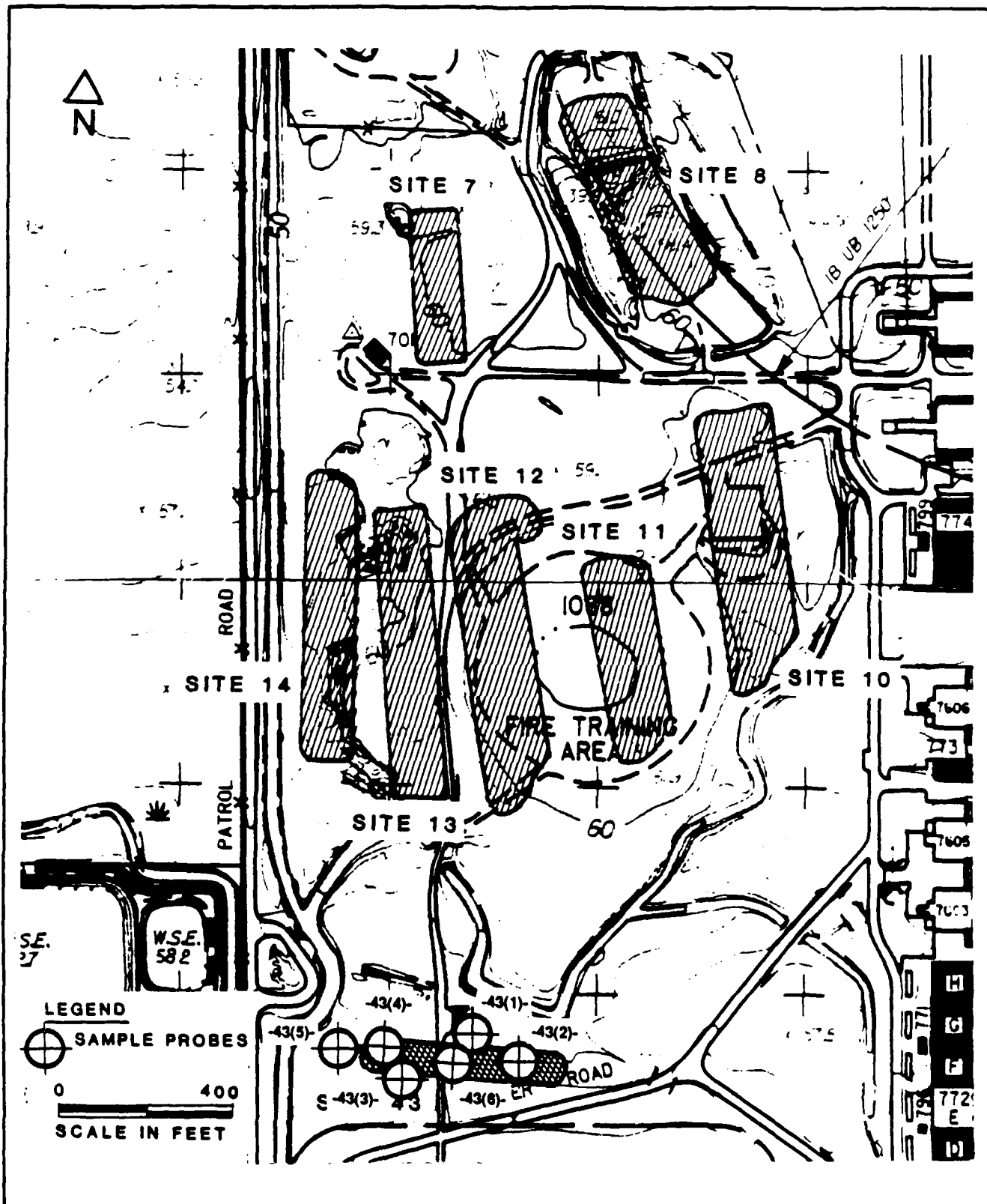


Figure 5-13. Sample Locations for Area C, Site 43, at McClellan AFB.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Site 43, are given in Table 2-12. Table 5-14 further summarizes the Table 2-12 results. Table 5-14 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.10 Landfill Gas Testing Results for Site 69

Site 69 is located 380 feet northwest of Building 704 on the west side of the base. The site area consists of two burn pits: one is 180 feet by 36 feet, and the other is 350 feet by 60 feet. The two sites are approximately 40 feet apart and have been treated as one site. The site does not appear to have any current use. Historical soil samples collected from the east pit by McLaren contained metal pieces, plastic, rubber, concrete, and wood. A composite analysis of the waste showed a variety of VOC and non-VOC compounds. VOC detected included vinyl chloride (260-850 ug/kg), trichloroethylene (420-440 ug/kg), and trans-1,2-dichloroethylene (210-370 ug/kg). This sample also showed elevated concentrations of five total heavy metals, and concentrations of soluble cadmium and soluble lead above STLC values. Historical soil samples collected from the west pit by McLaren contained metals pieces, sludge, rubber, plastic, and glass. A composite analysis of the waste showed a variety of VOC and non-VOC compounds, including phenanthrene (200 ug/kg) and pyrene (250 ug/kg) at elevated levels. This sample also showed elevated concentrations of four total heavy metals, including total lead above TTLC values. The concentration of soluble lead was above STLC values.

Figure 5-14 contains an area map reflecting the landfill area and sample locations, labeled 69(1) through 69(8). A total of eight probe samples were taken; six landfill and two perimeter probes. The range of probe sampling depths was three to eight feet; and eight-foot target depth was reached on five of the eight probes.

TABLE 5-14. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 43 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill		Perimeter	
	Number of Probes ^b Above Average LOQ	Highest Concentration ^c (ppbv)	Number of Probes ^b Above Average LOQ	Highest Concentration ^c (ppbv)
Benzene	1	600	0	0
Perchloroethylene	2	1 ^d	0	0
Methyl Chloroform	1	<0.80 ^d	1	0.8
Trichloroethylene	3	4	3	4

^a Four landfill probes and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-12, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

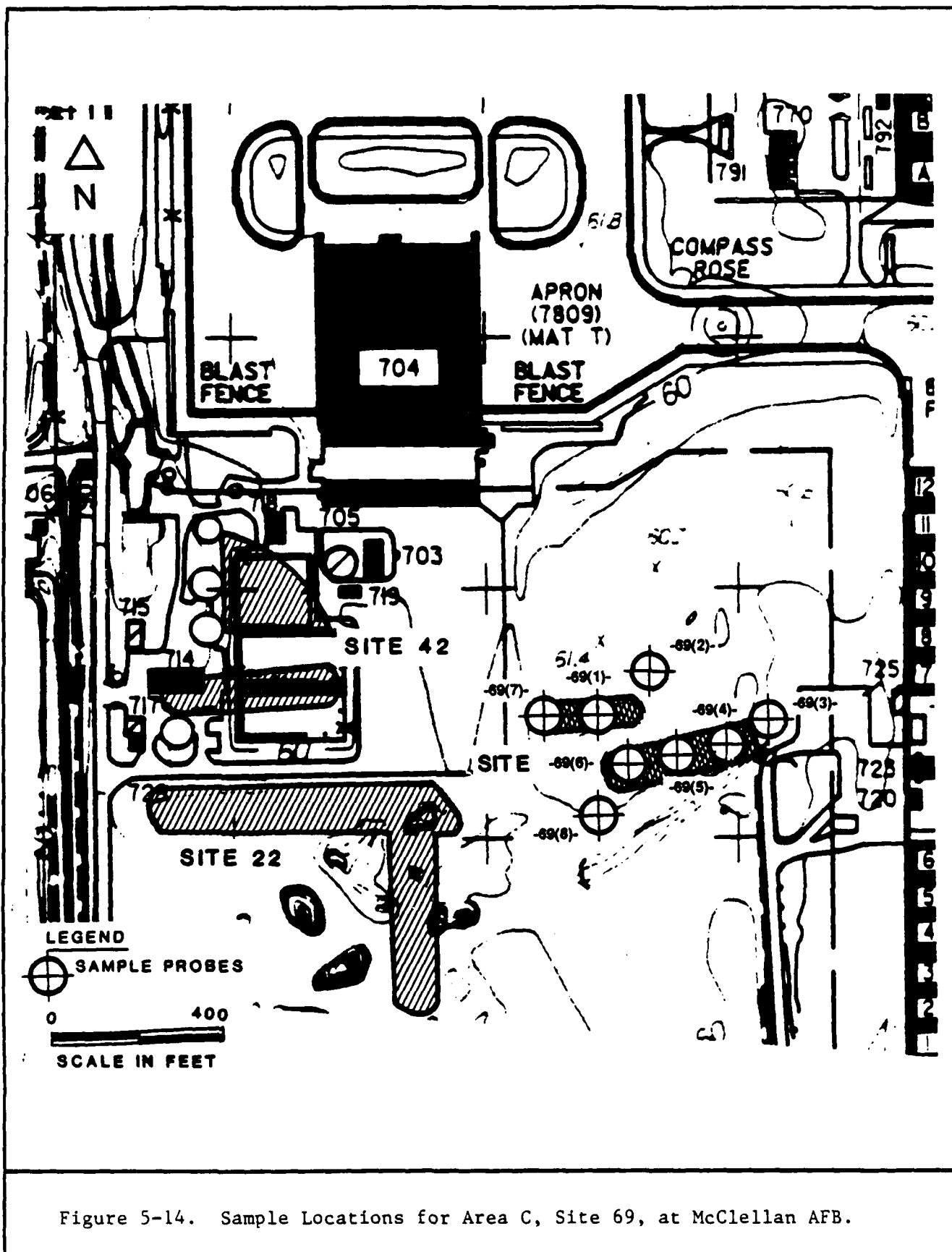


Figure 5-14. Sample Locations for Area C, Site 69, at McClellan AFB.

Landfill and perimeter probe samples were collected for Site 69 on December 9 and 10. Approximately 0.1 inch of rain occurred on December 9, and a "trace" of rain fell on December 10. In the 72 hours prior to sampling on the 9th, approximately 1.0 inches of precipitation occurred. In the 72 hours prior to sampling on the 10th, approximately 0.50 inches plus a "trace" of rain occurred.

A hand auger was used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling area. Hand auger samples were collected on December 9. The soil was saturated to an approximate depth of 4 feet. Below this depth was an impenetrable layer of gravel was encountered.

The analytical results for landfill gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Site 69, are given in Table 2-13. Table 5-15 further summarizes the Table 2-13 results. Table 5-15 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.11 Soil-Vapor Wells

There are nine vapor wells located west of the Area D cap. The locations of these wells are shown in Figure 5-15. These nine wells are grouped into three sets of three-well clusters. Each cluster is made up of a shallow, middle, and deep monitoring zone well of respective depths of 10 to 20 feet, 35 to 50 feet, and 65 to 80 feet. A schematic diagram of the well construction is given in Figure 5-16. One air sample was collected from each of the nine vapor wells. Sampling of these vapor well samples constituted gas migration testing for the Area D cap. No ground probes were installed in the Area D clay cap.

TABLE 5-15. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 69 AND FILL GENERATION AND OFF-SITE GAS MIGRATION^a

Compound	Landfill			Perimeter	
	Number of Probes Above Average LOQ ^b	Highest Concentration (ppbv) ^c		Number of Probes Above Average LOQ ^b	Highest Concentration (ppbv) ^c
Vinyl Chloride	1	400		0	0
Benzene	1	1,000		0	0
Perchloroethylene	2	4		0	0
Methyl Chloroform	6	4		2	4
Trichloroethylene	6	40		2	8

^a Six landfill probes and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-13, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

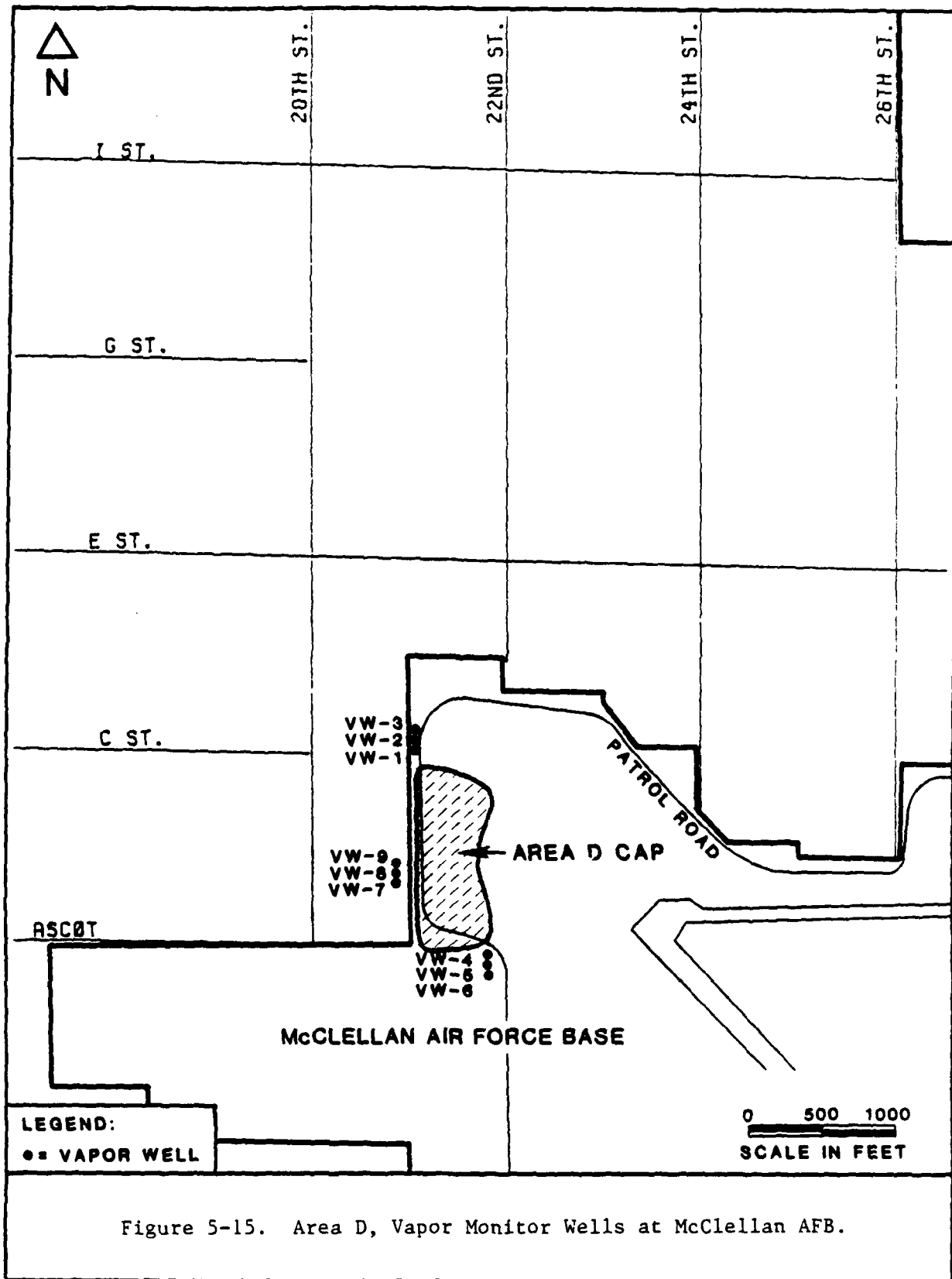
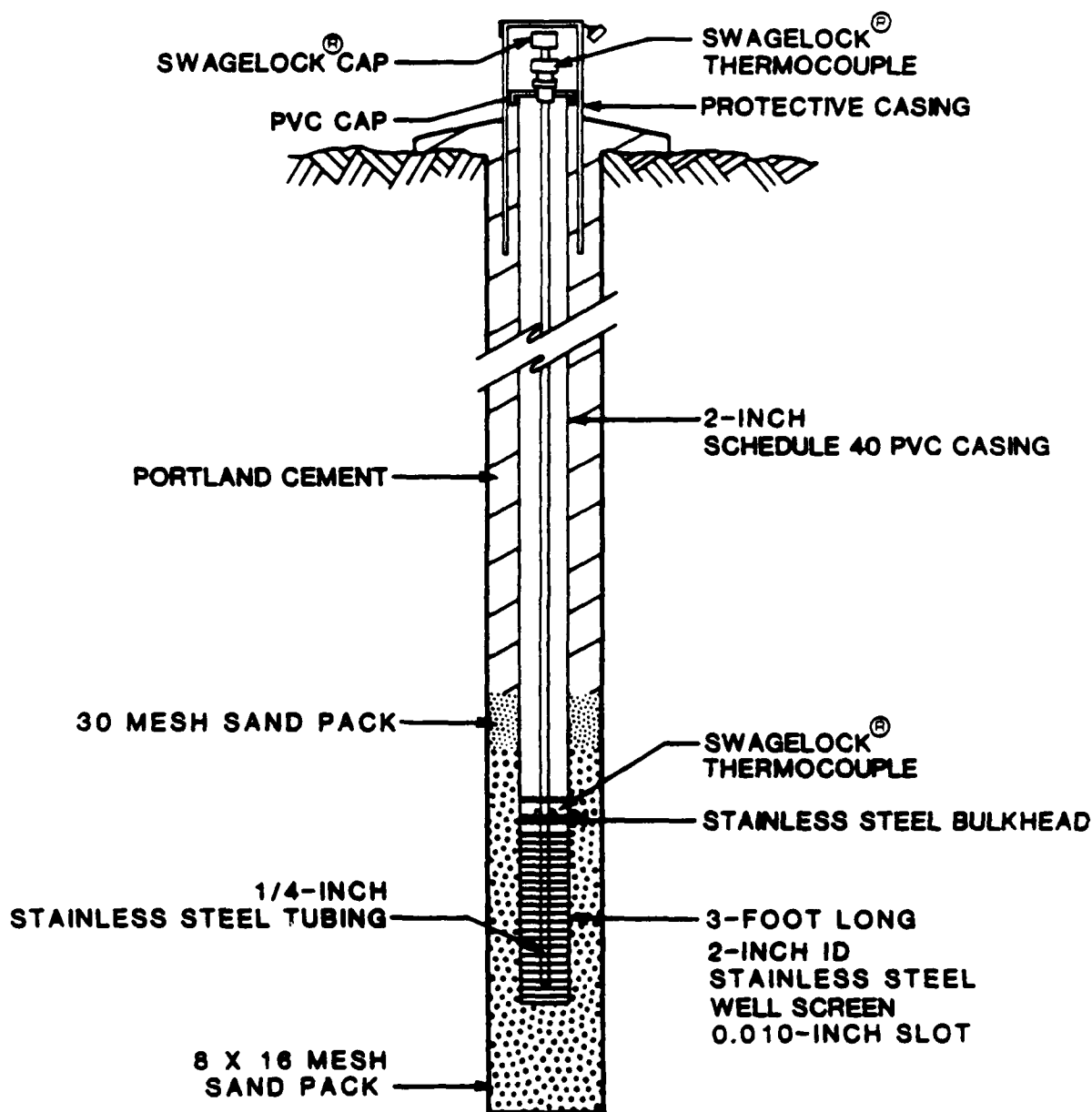


Figure 5-15. Area D, Vapor Monitor Wells at McClellan AFB.



S297

Figure 5-16. Schematic Diagram of Area D, Soil Vapor Well Completion at McClellan AFB.

The nine vapor wells were sampled by taking soil gas samples as follows. The vapor wells were calculated to hold approximately two liters of volume (see calculation sheet Appendix E). The vacuum pump used by Tracer to evacuate air from soil probes evacuated well in excess of 4 liters per minute (lpm). A rotometer was used by Tracer to measure the air flow. A 4.1 lpm air flow was achieved. The vacuum pump was allowed to run for approximately two minutes to ensure soil gases were being sampled; while the vacuum pump continued to run, a syringe sample was collected and analyzed the same way a soil probe sample was. The dates of sample collection at the Radian Vapor wells were December 7th and 15th.

The analytical results for the vapor wells are given in Table 2-14. Table 5-16 further summarizes the Table 2-14 results. Table 5-16 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.12 Gas Vents in Area D

Area D contains a gas collection and monitoring system that consists of 32 gas vents which extend into the solid waste under the Area D cap. Each gas vent is designed to allow for the measurement of gas pressure. However, the gas generated from the landfill can also be collected. No ground probes were installed in the Area D clay cap. The soil-gas generation potential of this area was assessed by collecting soil-gas samples directly from the pressure port of each vent.

A total of 14 gas vents were sampled; Figure 5-17 shows their exact locations.

Gas vent samples were collected December 7, 8, 9, 11, 14 and 15th. The gas vents were calculated to contain approximately 17 liters of gas (see Appendix E for worksheet); although the system is interconnected, the purge volume was calculated for the length of vertical pipe extending over the land

TABLE 5-16. SUMMARIZED ANALYTICAL RESULTS OF AREA D SOIL-GAS MONITOR WELLS^a

Compound	Number of Samples ^b Above Average LOQ	Highest Concentration ^c (ppbv)
Vinyl Chloride	6	<400 ^d
Benzene	6	<100 ^d
Ethylene Dibromide	6	<3 ^d
Ethylene Dichloride	6	<200 ^d
Methylene Chloride	5	<300 ^d
Perchloroethylene	5	90
Carbon Tetrachloride	7	30
Methyl Chloroform	8	900
Trichloroethylene	9	6,000 ^d
Chloroform	6	<4 ^d

^a Nine soil gas monitor wells were sampled at this site. All analytical results are presented in Table 2-14, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

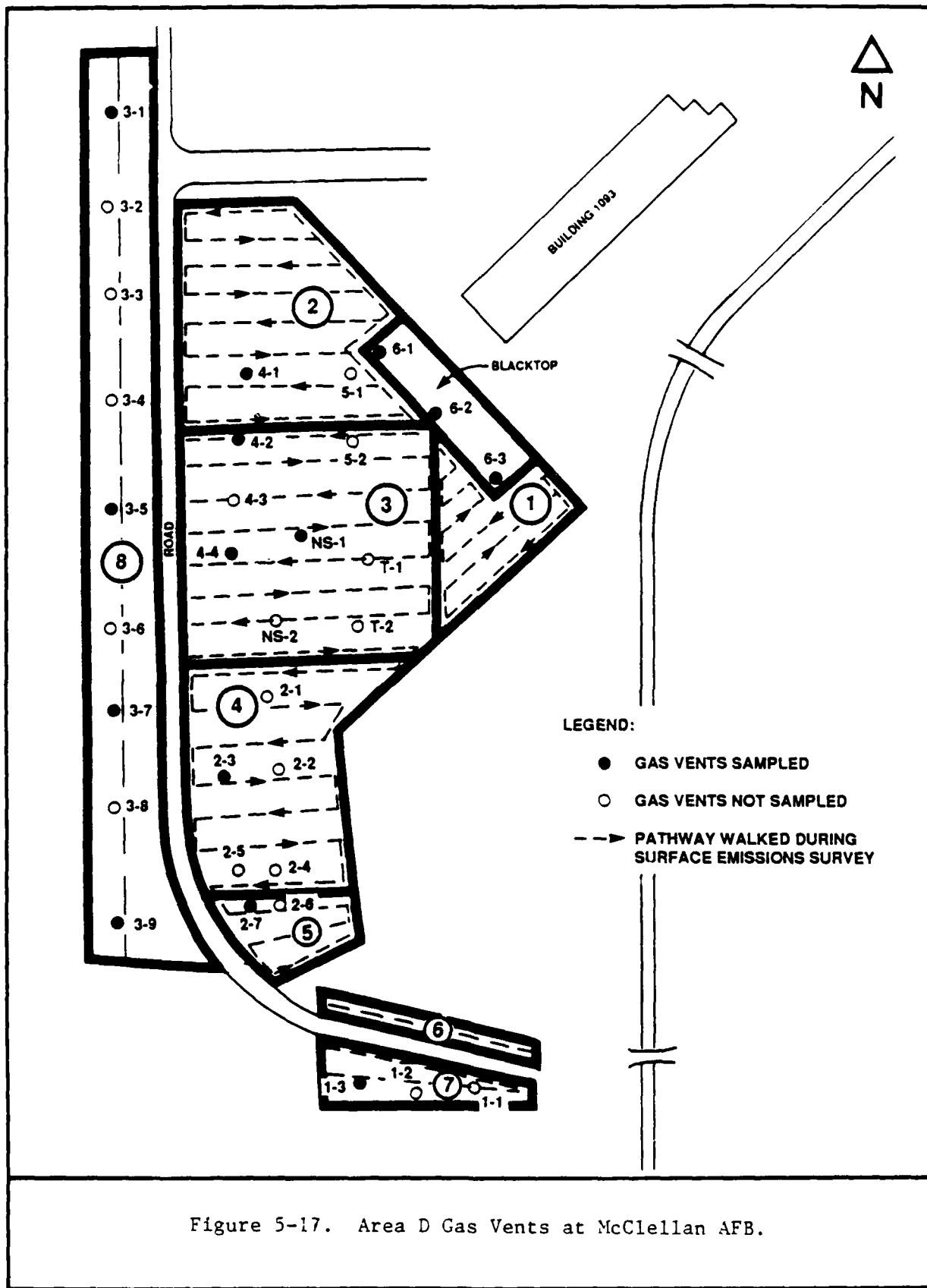


Figure 5-17. Area D Gas Vents at McClellan AFB.

0188-017-3

surface. A flow rate of 4.1 lpm was achieved by the vacuum pump. Over two gas vent volumes were evacuated by running the vacuum pump at the well for nine minutes per sample. The syringe sample was taken while the vacuum pump continued to run.

The analytical results for the vapor wells are given in Table 2-15. Table 5-17 further summarizes the Table 2-15 results. Table 5-17 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

TABLE 5-17. SUMMARIZED ANALYTICAL RESULTS OF AREA D GAS COLLECTION SYSTEM^a

Compound	Number of Samples Above Average LOQ ^b	Highest Concentration ^c (ppbv)
Vinyl Chloride	4	<200 ^d
Benzene	4	100 ^d
Ethylene Dibromide	3	<0.8 ^d
Ethylene Dichloride	3	<100 ^d
Methylene Chloride	3	<200 ^d
Perchloroethylene	3	9 ^d
Carbon Tetrachloride	3	<0.2 ^d
Methyl Chloroform	13	2,000
Trichloroethylene	11	2,000 ^d
Chloroform	3	<2.0 ^d

^a Fourteen gas vents were sampled at this site. All analytical results are presented in Table 2-15, including the sampling depths for the landfill and perimeter probes.

^b LOQ = Limit of quantitation.

^c ppbv = Parts per billion volume; original field data in units of ug/L.

^d This value represents the highest daily analytical detection limit (method detection limit); no quantitative data were available.

6.0 REMEDIAL ACTION

No remedial action has been performed at the McClellan AFB landfill sites numbered in this report Sites 7, 8, 10, 11, 12, 13, 14, 22, 38, 43, and 69. The Area D vapor monitor wells, identified as VW-1 through VW-9 and the gas vents identified as VC-1 through VC-6.3 are components of the Area D remedial action.

6.1 Ordered

No remedial action has been ordered at the landfill sites evaluated in this investigation.

6.2 Results

Because no remedial action has been ordered at the sites evaluated in this migration, no results for remedial action exist.

Each of the 13 landfill sites assessed in this field testing program and the Area D soil-vapor wells and gas vent system have been and will continue to be evaluated under the USAF's Installation Restoration Program and in accordance with the Comprehensive Environmental Response and Liability Act of 1980, the Superfund Amendments and Reauthorization Act of 1986, and the National Oil and Hazardous Waste Contingency Plan. It is anticipated that the field sampling techniques and analytical procedures used in this assessment to determine the gas generation and gas migration potential for each site will be interpreted using risk assessment techniques to help qualify the relative risk posed by each site to public health and the environment.

7.0

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APPENDIX A

Condensed Analytical Results
(ppmv)

RADIAN CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CH2Cl2 ppm	CHCl3 ppm	1,2-DCB ppm	TCB ppm	CCl4 ppm	TCE ppm	EDB ppm	PCE ppm	Benzene ppm	Vinyl Chloride ppm
S61-14P	5'	12/02	<0.03	<0.0004	<0.02	<0.0002	0.00006	<0.0004	<0.0001	0.0002	<0.01	<0.01
S62-14L	5.5'	12/02	<0.03	<0.0004	<0.02	<0.0002	0.00005	<0.0004	<0.0001	<0.0002	<0.01	<0.01
S62B-14L	8'	12/03	0.1	0.04	<0.02	0.004	<0.00002	0.002	<0.0001	0.01	<0.001	<0.02
S63-14P	5.25'	12/04	<0.01	<0.0002	<0.01	0.0004	0.0001	<0.0002	<0.0001	0.0001	<0.06	<0.02
S64-14P	5.5'	12/04	<0.01	<0.0002	<0.01	0.0008	<0.00002	<0.0002	<0.0001	0.0004	<0.06	<0.02
S65-13P	5'	12/04	<0.01	<0.0002	<0.01	0.0008	<0.00002	0.004	<0.0001	0.004	<0.06	<0.02
S66-13L	5'	12/04	<0.03	<0.0004	<0.02	0.0004	<0.00005	0.001	<0.0002	0.0002	<0.2	<0.03
S67-13P	12/04		0.2	<0.0004	<0.02	0.004	<0.00005	0.04	<0.0002	0.006	0.6	5
S68-7L	7.5'	12/04	3	<0.004	<0.02	0.02	<0.0005	0.4	<0.005	0.3	<2	2
S69-7L	7'	12/05	<0.03	<0.0004	<0.02	0.0008	<0.00003	0.01	<0.0003	0.06	<0.01	0.08
S610-7L	6'	12/05	9	0.004	<0.02	0.1	<0.00003	0.04	<0.0003	0.04	<0.01	0.08
S611-7L	7.5'	12/05	5	<0.004	<0.2	<0.002	<0.0003	0.4	<0.003	0.2	<0.01	2
S612-7L	8'	12/05	3	<0.0008	<0.05	0.006	<0.00008	0.04	<0.0004	0.04	<0.02	<0.08
S613-7P	2'	12/05	0.1	<0.0004	<0.02	0.0004	0.0001	0.001	<0.0003	<0.00008	<0.01	<0.03
S614-10P	4'	12/05	<0.01	<0.0002	<0.01	0.0004	0.0001	0.0004	<0.00006	0.00009	<0.006	<0.02
S615-10P	6'	12/05	<0.03	<0.0004	<0.02	<0.0002	<0.00003	<0.0004	<0.0003	<0.00008	<0.01	<0.03
S616-10P	6'	12/05	<0.03	<0.0004	<0.02	<0.0002	<0.00003	<0.0004	<0.0003	<0.00008	<0.01	<0.03
S617-11P	6'	12/05	<0.01	<0.0002	<0.01	<0.00008	<0.00002	<0.0002	<0.00006	<0.00003	<0.006	<0.02
9W-3	12/07		<0.03	<0.0004	<0.006	<0.0002	0.01	0.01	<0.0003	<0.00009	<0.02	<0.04
9W-2	12/07		<0.3	<0.004	0.2	<0.002	0.03	0.08	<0.003	<0.0009	<0.2	<0.1
9W-1	12/07		<0.02	<0.002	<0.2	<0.0008	0.003	<0.002	<0.001	<0.0004	<0.1	<0.3
9C-3	5'	12/08	<0.06	<0.0006	<0.05	0.08	<0.00006	0.02	<0.0003	<0.0001	<0.02	<0.04
9C-3	7'	12/07	<0.02	<0.0002	<0.02	0.006	<0.00002	0.001	<0.0001	<0.0001	<0.01	<0.03
9C-3	9'	12/07	<0.06	<0.0008	<0.05	0.02	<0.00008	0.004	<0.0004	0.0002	<0.06	<0.1
S618-13P	5.5'	12/07	<0.02	<0.0002	<0.02	0.0002	<0.00005	0.001	<0.0001	0.0001	0.03	<0.03
S619-13L	7'	12/07	<0.02	<0.0002	<0.02	0.0002	<0.00006	0.002	<0.0001	0.001	<0.01	<0.03
S620-13P	7'	12/07	<0.02	<0.0002	<0.02	0.0008	0.0001	0.004	<0.0001	<0.00004	<0.01	<0.03
S621-13L	7'	12/07	<0.02	<0.0002	<0.02	0.0004	0.0001	0.002	<0.0001	<0.00004	0.6	<0.03
S622-13P	4'	12/07	<0.02	<0.0002	<0.02	0.0004	0.00003	0.001	<0.0001	<0.00004	<0.01	<0.03
S623-13L	4'	12/07	<0.02	<0.0002	<0.02	<0.0006	<0.00002	0.004	<0.0001	0.0006	<0.01	<0.03
S624-12P	5'	12/07	<0.02	<0.0002	<0.02	0.004	<0.00002	0.004	<0.0001	0.003	0.1	<0.03
S625-12P	6'	12/07	<0.6	2	<0.5	<0.004	0.06	8	<0.004	4	32	56
S626-11P	2'	12/07	<0.02	<0.0002	<0.02	0.0006	<0.00002	0.004	<0.0001	0.0001	0.01	<0.03

Notations:
 I interference with adjacent peaks
 NI not analyzed

Analyzed by O. Abranovic
 Checked by J. Tangeman
 Proofed by L. Lepander

Tracer Research Corporation

RADIAN CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CO2 ppm	O2 ppm	N2 ppm	CH4 ppm
561-14P	6'	12/02	<21,000	140,000	750,000	<5,100
562-14L	9.5'	12/02	<21,000	120,000	700,000	<5,100
5626-14L	8'	12/03	53,000	170,000	820,000	<4,200
563-14P	5.25'	12/04	<910	220,000	840,000	<2,100
564-14P	5.5'	12/04	2,200	200,000	840,000	<2,100
565-13P	5'	12/04	9,100	94,000	870,000	<2,100
566-13L	5'	12/04	2,000	190,000	840,000	<2,100
567-13P		12/04	23,000	48,000	550,000	74,000
568-7L	7.5'	12/04	19,000	94,000	670,000	32,000
569-7L	7'	12/05	6,300	160,000	800,000	<1,100
5610-7L	6'	12/05	9,100	110,000	820,000	2,100
5611-7L	7.5'	12/05	35,000	17,000	430,000	99,000
5612-7L	6'	12/05	11,000	94,000	800,000	<1,100
5613-7P	2'	12/05	740	230,000	820,000	<1,100
5614-10P	4'	12/05	<490	230,000	820,000	<1,100
5615-10P	6'	12/05	1,200	200,000	780,000	<1,100
5616-10P	6'	12/05	1,500	220,000	800,000	<1,100
5617-11P	6'	12/05	9,700	110,000	850,000	<1,100
WV-3		12/07	910	200,000	870,000	<4,600
WV-2		12/07	540	200,000	870,000	<4,600
WV-1		12/07	<2,100	200,000	840,000	<4,600
WV-3	5'	12/08	6,300	140,000	82,000	<5,400
WV-3	7'	12/07	1,600	200,000	850,000	<4,600
WV-3	9'	12/07	3,400	190,000	820,000	<4,600
5618-43P	5.5'	12/07	2,100	190,000	890,000	<4,600
5619-43L	7'	12/07	6,800	160,000	890,000	<4,600
5620-43P	7'	12/07	1,800	160,000	820,000	<4,600
5621-43L	7'	12/07	2,100	130,000	440,000	<4,600
5622-43P	4'	12/07	800	160,000	660,000	<4,600
5623-43L	4'	12/07	570	200,000	870,000	<4,600
5624-12P	5'	12/07	2,900	170,000	850,000	<4,600
5625-12P	6'	12/07	13,000	30,000	800,000	37,000
5626-11P	2'	12/07	6,300	19,000	840,000	26,000

Notations:
I interference with adjacent peaks
NH not analyzed

Analyzed by D. Abranovic
Checked by J. Tangeman
Prepared by J. Leolander

Tracer Research Corporation



RADIANT CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CHC12 ppm	CHC13 ppm	1,2-DCA ppm	TCR ppm	CC14 ppm	TCE ppm	EDB ppm	PCE ppm	Benzene ppm	Vinyl Chloride ppm
VC-3-1	12/09		<0.06	<0.0006	<0.05	0.2	<0.00006	0.01	<0.0004	<0.0001	<0.03	<0.04
VC-4-1	12/09		<0.06	<0.0006	<0.05	0.02	<0.00006	<0.0006	<0.0004	<0.0001	<0.03	<0.04
VC-4-2	12/09		<0.02	<0.0004	<0.02	0.02	<0.00003	<0.0002	<0.0001	<0.00006	<0.01	<0.02
VC-4-4	12/09		<0.02	<0.0004	<0.02	<0.0001	<0.00003	<0.0002	<0.0001	<0.00006	<0.01	<0.02
VC-2-3	12/09		<0.02	<0.0004	<0.02	0.2	<0.00003	0.02	<0.0001	<0.00006	<0.01	<0.02
5627-69L	7"		<0.02	<0.0004	<0.02	0.001	<0.00003	0.004	<0.0001	<0.00006	<0.01	<0.02
5638-69P	5"		<0.02	<0.0004	<0.02	0.002	<0.00003	0.008	<0.0001	<0.00006	<0.01	<0.02
5629-69L	8"		<0.06	<0.0006	<0.05	0.001	<0.00006	0.008	<0.0004	<0.0001	1	0.4
5630A-69L	8"		<0.02	<0.0004	<0.02	0.002	<0.00003	0.04	<0.0001	0.004	<0.01	<0.02
5630B-64L	8"		<0.02	<0.0004	<0.02	0.004	<0.00003	0.02	<0.0001	0.003	<0.01	<0.02
5631-69L	8"		<0.02	<0.0004	<0.02	0.001	<0.00003	0.006	<0.0001	<0.00006	<0.01	<0.02
5632-69L	8"		<0.02	<0.0004	<0.02	0.001	<0.00003	0.004	<0.0001	<0.00006	<0.01	<0.02
5633-69P	8"		<0.02	<0.0002	<0.02	0.004	<0.00002	0.006	<0.0001	<0.00004	<0.006	<0.01
5634-22L	7"		<0.02	<0.0002	<0.02	0.004	<0.00002	0.04	<0.0001	<0.00004	<0.006	<0.01
5635-22L	8"		<0.02	<0.0002	<0.02	0.004	<0.00002	0.01	<0.0001	0.03	<0.006	<0.01
5636-22L	7"		<0.03	<0.0004	<0.02	0.002	<0.00005	0.004	<0.0003	0.003	0.01	<0.03
5637-23P	5"		<0.02	<0.0002	<0.02	0.008	<0.00002	0.4	<0.0001	0.006	0.006	<0.01
5638-22L	8"		<0.03	<0.0004	<0.02	<0.0002	<0.00005	0.4	<0.0003	0.003	1	4
5639-8P	4"		<0.02	<0.0002	<0.02	0.002	<0.00002	0.008	<0.0001	0.01	<0.006	0.01
5640-81	8"		<0.03	<0.0004	<0.02	0.4	<0.00005	0.4	<0.0003	1	0.006	<0.01
5641-81	8"		<0.9	<0.008	<0.8	10	<0.0008	0.4	<0.004	7	<0.01	<0.03
5642-8P	4"		<0.3	<0.004	<0.2	0.02	<0.0005	0.02	<0.003	0.2	0.02	0.04
5643-8P	4"		<0.01	<0.0001	<0.008	0.009	<0.00001	0.004	<0.00005	0.04	0.2	<0.02
VC-2-7	12/11		<0.01	<0.0001	<0.008	2	<0.00001	2	<0.00005	0.0006	<0.006	<0.02
5644-81	8"		<0.03	<0.0004	<0.02	0.009	<0.00005	0.04	<0.0003	0.3	<0.03	0.00
5645-81	7"		<0.01	<0.0001	<0.008	0.002	<0.00001	0.008	<0.00005	0.09	0.002	<0.02
5646-81	8"		<0.9	<0.004	<0.02	2	<0.0005	0.8	<0.003	0.6	2	80
5647-42L	4"		<0.1	<0.001	<0.08	0.2	<0.0001	0.2	<0.0005	0.03	<0.06	<0.1
5648-42L	4"		<0.01	<0.0001	<0.008	0.002	<0.00001	0.08	<0.00005	0.003	0.006	<0.02
5649-43L	3"		<0.1	<0.001	<0.08	0.04	<0.0001	3	<0.0005	0.02	<0.06	0.1
5650-42L	6"		<0.01	<0.0001	<0.008	0.01	<0.00001	0.04	<0.00005	0.003	<0.006	0.02
5653-42L	3"		<0.01	<0.0001	<0.008	0.0004	<0.00001	0.004	<0.00005	0.006	0.006	0.02
5654-38L	6"		<0.01	<0.0001	<0.008	0.01	<0.00001	0.02	<0.00005	0.3	<0.006	0.02
5655-38L	4"		<0.1	<0.001	<0.08	0.1	0.008	0.1	<0.0005	0.09	0.06	0.2
5656-38L	4"		<0.1	<0.001	<0.08	0.006	<0.0001	0.01	<0.0005	0.09	0.06	0.2
5657-38L	2"		<0.01	<0.0001	<0.008	0.0008	<0.00001	0.004	<0.00005	0.00002	0.002	<0.02

Notations:

- I Interference with adjacent peaks
- NI not analyzed

Analyzed by D. Abramovic

Checked by S. Cherba

Proofed by L. Laplander

Tracer Research Corporation



RADIAN CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CO2 ppm	O2 ppm	N2 ppm	CH4 ppm
90-3-1		12/09	11,000	78,000	840,000	<5,800
90-4-1		12/09	4,000	160,000	790,000	<5,800
90-4-2		12/09	4,700	160,000	810,000	<5,800
90-4-4		12/09	1,600	190,000	800,000	<5,800
90-4-3		12/09	5,700	160,000	790,000	<5,800
56-22-69L	7'	12/09	<2,500	200,000	840,000	<5,800
56-28-89P	5'	12/09	2,800	140,000	870,000	<5,800
56-29-89L	8'	12/09	12,000	58,000	850,000	<5,800
56-30A-89L	8'	12/09	5,700	140,000	770,000	<5,800
56-30B-89L	9'	12/09	4,100	160,000	770,000	<5,800
56-31-89L	9'	12/09	9,700	78,000	870,000	<5,800
56-32-89L	8'	12/09	19,000	190,000	820,000	<5,800
56-33-89P	9'	12/10	1,100	160,000	780,000	<5,100
56-34-22L	7'	12/10	11,000	72,000	790,000	<5,100
56-35-22L	8'	12/10	9,100	75,000	800,000	<5,100
56-36-22L	7'	12/10	1,800	69,000	840,000	<5,100
56-37-22P	5'	12/10	550	150,000	680,000	<5,100
56-38-22L	8'	12/10	1,700	45,000	850,000	<5,100
56-39-0P	4'	12/10	<2,200	170,000	740,000	<5,100
56-40-81	8'	12/10	12,000	110,000	780,000	<5,100
56-41-81	8'	12/10	10,000	94,000	780,000	<5,100
56-42-8P	4'	12/10	1,100	160,000	750,000	<5,100
56-43-8P	4'	12/11	740	160,000	780,000	<5,400
90-2-7		12/11	2,500	170,000	730,000	<5,400
56-44-81	8'	12/11	12,000	100,000	750,000	<5,400
56-45-81	7'	12/11	1,800	200,000	870,000	<5,400
56-46-81	8'	12/11	15,000	42,000	800,000	<5,400
56-47-42L	4'	12/11	10,000	180,000	870,000	<5,400
56-48-42L	4'	12/11	6,300	150,000	890,000	<5,400
56-49-42L	3'	12/11	9,500	190,000	870,000	<5,400
56-50-42L	7'	12/11	6,800	170,000	840,000	<5,400
56-53-42L	3'	12/11	<2,500	120,000	780,000	<5,400
56-54-38L	6'	12/11	5,700	86,000	850,000	<5,400
56-55-38L	4'	12/11	3,900	170,000	800,000	<5,400
56-56-38L	4'	12/11	<1,400	170,000	840,000	<5,400
56-57-38L	2'	12/11	2,500	200,000	840,000	<5,400

Notations:

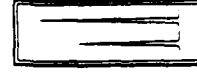
- 1. interference with adjacent peaks
- NA not analyzed

Analyzed by D. Abranovic

Checked by S. Cherba

Printed by [redacted] L. [redacted]

Tracer Research Corporation



RADIUM CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CHC12 ppm	CHC13 ppm	1,2-DCE ppm	TOH ppm	CC14 ppm	TOE ppm	EOB ppm	PCE ppm	Benzene ppm	Vinyl Chloride ppm
5563-2-UP	2'	12/14	<0.02	<0.0002	<0.01	0.002	<0.00002	0.02	<0.00008	0.002	0.01	<0.02
5563-2-UP	3'	12/14	<0.02	<0.0002	<0.01	0.0008	0.00002	0.02	<0.00008	0.004	0.01	<0.02
5563-2-UL	3'	12/14	<0.02	<0.0002	<0.01	0.01	<0.00002	0.08	<0.00008	<0.00004	0.01	<0.02
5563-2-UL	3'	12/14	<0.02	<0.0002	<0.01	0.0008	<0.00002	0.008	<0.00008	<0.00004	0.01	<0.02
5563-2-UL	3'	12/14	<0.02	<0.0002	<0.01	0.2	<0.00002	0.04	<0.00008	0.003	0.01	<0.02
5563-2-UL	3'	12/14	<0.02	<0.0002	<0.01	0.002	<0.00002	0.004	<0.00008	<0.00004	0.01	<0.02
5563-2-UL	3'	12/14	<0.02	<0.0002	<0.01	0.002	<0.00002	0.004	<0.00008	<0.00004	0.01	<0.02
5563-2-UL	3'	12/14	<0.02	<0.0002	<0.01	0.4	<0.00002	0.04	<0.00008	<0.00004	0.1	<0.02
5563-2-UL	3'	12/14	<0.02	<0.0002	<0.01	1	<0.00002	0.04	<0.00008	<0.00004	0.1	<0.02
5563-1	12/14	<0.2	<0.002	<0.002	<0.1	2	<0.00002	0.08	<0.00008	0.009	0.1	<0.02
5563-1-UP	5'	12/15	1	0.04	<0.2	0.08	0.01	5	<0.003	4	<0.6	52
5563-1-UP	5'	12/15	1	0.001	<0.008	0.002	<0.00002	0.2	<0.00006	0.1	1	22
5563-1	12/15	<0.009	<0.0002	<0.0002	<0.008	0.02	<0.00002	0.009	<0.00006	0.0009	<0.01	<0.03
5563-4	12/15	<0.009	<0.0002	<0.0002	<0.008	0.001	<0.00002	0.6	<0.00006	0.002	<0.01	<0.03
5563-5	12/15	<0.09	<0.002	<0.002	<0.08	0.008	<0.00002	0.8	<0.00006	<0.0003	<0.1	<0.3
5563-6	12/15	<0.009	<0.0002	<0.0002	<0.008	0.01	<0.00002	0.1	<0.00006	<0.00003	<0.01	<0.03
5563-9	12/15	<0.09	<0.002	<0.002	<0.08	0.08	<0.00002	0.1	<0.00006	0.02	<0.1	<0.3
5563-8	12/15	<0.09	<0.002	<0.002	<0.08	0.9	<0.00002	1	<0.00006	0.03	<0.1	<0.3
5563-7	12/15	<0.09	<0.002	<0.002	<0.08	0.8	<0.00002	6	<0.00006	0.09	<0.1	<0.3

Tracer Research Corporation

Notations:
1 - interference with adjacent peaks
NA - not analyzed

Analyzed by R. H. Amore
Checked by S. Chertko
Proofed by S. Chertko

RADIUM CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CO ₂ ppm	O ₂ ppm	N ₂ ppm	CH ₄ ppm
5003-2P	2'	12/14	12,700	190,000	750,000	<5,800
5003-24P	3'	12/14	12,700	190,000	730,000	<5,800
5003-24	3'	12/14	680	180,000	710,000	<5,800
5004-24	3'	12/14	12,700	180,000	690,000	<5,800
5003-24	3'	12/14	12,000	69,000	760,000	<5,800
5003-24	3'	12/14	2,700	20,000	730,000	<5,800
50-1-3	?	12/14	970	190,000	720,000	<5,800
50-6-3	?	12/14	4,700	150,000	750,000	<5,800
50-6-2	?	12/14	4,400	170,000	770,000	<5,800
50-6-1	?	12/14	3,400	170,000	770,000	<5,800
5064-12P	6'	12/15	12,000	44,000	650,000	19,000
5065-12P	5'	12/12	3,200	61,000	620,000	45,000
50-10-1	?	12/15	10,000	32,000	750,000	<5,300
50-4	?	12/15	2,200	110,000	760,000	<5,300
50-5	?	12/15	6,300	110,000	750,000	<5,300
50-6	?	12/15	1,900	110,000	690,000	<5,300
50-7	?	12/15	3,500	94,000	760,000	<5,300
50-8	?	12/15	4,100	66,000	780,000	<5,300
50-7	?	12/15	5,000	28,000	770,000	<5,300

Method used:

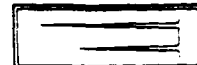
1. Inducted to ensure with adjacent peaks
 All not analyzed

Analyzed by D. Abramovic

Checked by S. Cherba

Reviewed by S. Cherba

Tracer Research Corporation



APPENDIX B

Raw Analytical Results
(ug/l)

Job KADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/2/87

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2.67 5.03

5.33

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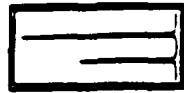
standard conc.		CH ₂ Cl ₂				CHCl ₃				1,2 DCA				TCA			
		200		µg/l		10		µg/l		200		µg/l		5		µg/l	
response from 10ul injection		area		area		area		area		area		area		area		area	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
		4044464	2408421	1019000	886083	413032	395256	413032	395256	1477956	1500000 ^F	1477956	1500000 ^F	1477956	1500000 ^F	1477956	1500000 ^F
RFs for this sheet		4.95 x 10 ⁻¹⁴		q/area		1.03 x 10 ⁻¹⁶		q/area		4.99 x 10 ⁻¹⁵		q/area		3.35 x 10 ⁻¹⁷		q/area	
sample	time	amt in µl	area	µg/l	mean	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	mean
N ₂ blank	1044	1000	250000	2.2	2.2	250000	2.005	250000	2.005	250000	2.2	250000	2.2	250000	2.002	250000	2.002
in sample	1102	2000	250000	2.1	2.1	250000	2.002	250000	2.002	250000	2.06	250000	2.06	250000 ^F	2.001	250000	2.001
N ₂ blank	1411	2000	250000	2.1	2.1	250000	2.002	250000	2.002	250000	2.06	250000	2.06	250000	2.0008	250000	2.0008
system blank	1433	2000	250000	2.1	2.1	250000	2.002	250000	2.002	250000	2.06	250000	2.06	250000 ^F	2.0009	250000	2.0009
50-1-14P.C.	1451	2000	250000	2.1	2.1	250000	2.002	250000	2.002	250000	2.06	250000	2.06	250000	2.0008	250000	2.0008
50-1-14P.C.	1510	2000	250000	2.1	2.1	250000	2.002	250000	2.002	250000	2.06	250000	2.06	250000	2.0008	250000	2.0008
50-2-14L.5.5	1558	2000	250000	2.1	2.1	250000	2.002	250000	2.002	250000	2.06	250000	2.06	250000	2.0008	250000	2.0008
50-2-14L.5.5	1615	2000	250000	2.1	2.1	250000	2.002	250000	2.002	250000	2.06	250000	2.06	250000	2.0008	250000	2.0008
in sample	1633	2000	250000	2.1	2.1	250000	2.002	250000	2.002	250000	2.06	250000	2.06	250000 ^F	2.001	250000	2.001
STD	1659	10	433540			1185105		431871		431871				1676521			
			</														

Notations: RF response factor
 I interference with adjacent peaks
 NA not analysed
 E estimated peak area

Analysed by John Tangeman
 Checked by _____

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION



Date 12/2/87

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7.12

7.82

18.66

standard conc.		PCF		EDB		TCE		CCl ₄		RFs for this sheet			
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l	mean
1 blank	1044	1000	250000	2.0004	2.0004	250000	2.0004	250000	2.0004	2.0004	250000	2.0004	2.0004
2 sample	1102	2000	800000 ^F	.0003	.0003	800000	.0003	800000	.0003	.0003	800000	.0003	.0003
3 blank	1446	2000	250000	2.0004	2.0004	250000	2.0004	250000	2.0004	2.0004	250000	2.0004	2.0004
4 system blank	1453	2000	600000 ^E	.0003	.0003	600000	.0003	600000	.0003	.0003	600000	.0003	.0003
5 1-14P 6'	1451	2000	900000 ^F	.0004	.0004	900000	.0004	900000	.0004	.0004	900000	.0004	.0004
6 1-14P 6'	1510	2000	850000 ^F	.0004	.0004	850000	.0004	850000	.0004	.0004	850000	.0004	.0004
7 2-14L 5.5'	1558	2000	800000 ^E	.0003	.0003	800000	.0003	800000	.0003	.0003	800000	.0003	.0003
8 2-14L 5.5'	1615	2000	797000	.0003	.0003	797000	.0003	797000	.0003	.0003	797000	.0003	.0003
9 sample	1633	2000	800000 ^E	.0003	.0003	800000	.0003	800000	.0003	.0003	800000	.0003	.0003
10 Std	1659	10	252844			1364848		4339104			4339104		

Analysed by John Tangeman

Notations: I response factor
NA interference with adjacent peaks
F not analysed
E estimated peak area

Checked by

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/2/87

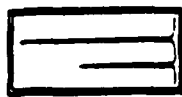
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7.31

		BENZENE															
standard conc.		1000		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
response from		1		15078066		area		1		area		1		area		1	
µl injection		2		15864706		1567687		area		area		2		area		2	
		3		15864706		area		3		area		3		area		3	
RFs for this sheet		6.44 x 10 ⁻¹⁶		g/area		mean		g/area		mean		g/area		mean		g/area	
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l
N ₂ blank	1044	1000	<100000	<.06	<.06												
air sample	1102	2000	<100000	<.03	<.03												
N ₂ blank	1411	2000	<100000	<.03	<.03												
system blank	1433	2000	<100000	<.03	<.03												
6-2-14P, 6	1451	2000	<100000	<.03	<.03												
6-2-14P, 6	1510	2000	<100000	<.03	<.03												
6-2-14L, 5.5	1558	2000	<100000	<.03	<.03												
6-2-14L, 5.5	1615	2000	<100000	<.03	<.03												
in sample	1633	2000	<100000	<.03	<.03												
STD	1659	10	17344379														

Notations:
I
NA
E

RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Engman
Checked by _____



TRACER RESEARCH CORPORATION

Job RADIAN (SACRAMENTO, CA)

Date 12/2/67 Page 10

standard conc.		VINYL CHLORIDE				PROPYLENE							
		25		µg/l		µg/l		µg/l		µg/l		µg/l	
		1 3850593		area		area		area		area		area	
		2 4150664		area		area		area		area		area	
		3 3272924		area		area		area		area		area	
		6.65 x 10 ⁻¹⁶		q/area		q/area		q/area		q/area		q/area	
RFs for this sheet		amt in		µg/l		µg/l		µg/l		µg/l		µg/l	
sample	time	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N ₂ blank	1044	<100000	2.07	2.07									
2nd sample	1102	<100000	2.03	2.03									
N ₂ blank	1433	<100000	2.03	2.03									
oxygen blank	1433	<100000	2.03	2.03									
56-1-14P1	1451	<100000	2.03	<2.03									
56-1-14P1	1510	<100000	2.03										
56-2-14L5.5	1558	<100000	2.03	2.03									
56-2-14L5.5	1615	<100000	2.03										
unsample	1633	<100000	2.03	2.03									
Std	1656	3499837											

RF response factor
Notations: 1 interference with adjacent peaks
NA not analysed
F estimated peak area

Analysed by John Tanguay
Checked by

Job RADIAN (SACRAMENTO, CA)

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Date 12/2/87

Page 1

1.39

1.41

2.51

		CO ₂		O ₂		N ₂		C ₂ H ₄		
standard conc.		264000		89600		739200		28800		
response from bul injection		1	748207	1	1109271	1	6924363	1	951565	
		2	720231	2	1035630	2	6814678	2	931471	
		3	653223	3	1097285	3	6916875	3	855304	
RFs for this sheet		3.73 x 10 ⁻¹⁰		8.29 x 10 ⁻¹¹		1.07 x 10 ⁻¹⁰		3.16 x 10 ⁻¹¹		
sample	time	amt in l	area	µg/l	mean	area	µg/l	area	µg/l	mean
1-1411	1411	2000	<100000	<19000	<4100	<100000	<54000	<100000	<1600	<27600
1-1417	1417	1000	<100000	<37000	<8300	<100000	<11000	<100000	<3200	<3200
1-1429	1429	1000	<100000	<37000	<19000	789200	850000	<100000	<3200	<3200
1-1434	1434	1000	<100000	<37000	130000	4902150	530000	<100000	<3200	<3200
1-1446	1452	1000	<100000	<37000	<18000	7714207	830000	<100000	<3200	<3200
1-1453	1503	1000	<100000	<37000	<18000	7796111	840000	<100000	<3200	<3200
1-1455	1559	1000	<100000	<37000	<16000	7462201	800000	<100000	<3200	<3200
1-1455	1608	1000	<100000	<37000	<16000	7292474	780000	<100000	<3200	<3200
1-1455	1611	1000	<100000	<37000	170000	7707816	830000	<100000	<3200	<3200
1-1455	1618	1000	685761			6215604		923560		

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Tangeman
Checked by _____

Job RADIANT (SACRAMENTO, CA)

Date 12/2/87

Page 1

CONDENSED DATA

[illegible]

RF response factor

RF response factor
Notations: I interference with adjacent peaks

Analysed by

Checked by

[illegible]

Notations:

response factor
interference with a
not analysed
estimated peak area

peaks

Analysed by

Checked by

100 RADIANT (SACRAMENTO, CA)

Date 12/3/87

Page 1

CONDENSED DATA

standard conc.		µg/l		µg/l		µg/l	
response from		area		area		area	
ul injection		1		2		3	
		area		area		area	
		1		2		3	
RFs for this sheet		q/area		q/area		q/area	
sample	time	amt	µg/l	area	µg/l	area	µg/l
	depth	in	CH ₂ Cl ₂	CH ₂ Cl ₂	CCl ₄	TCE	EOB
			area	area	area	area	area
			CH ₂ Cl ₂	CH ₂ Cl ₂	CCl ₄	TCE	EOB
			µg/l	µg/l	µg/l	µg/l	µg/l
			mean	mean	mean	mean	mean
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l
			1.206	1.009	1.008	1.008	1.008
			area	area	area	area	area
			1.206	1.009	1.008	1.008	1.008
			µg/l	µg/l	µg/l	µg/l	µg/l

Notations: RF

response factor

interference with adjacent peaks

Analysed by

not analysed
mat peak

Checked by

JOE RADIAN (SACRAMENTO, CA)

Date 12/3/87

Page 2

CONDENSED DATA

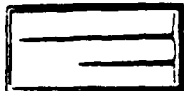
[illegible]

Notations:

RF	response factor
I	interference with adjacent peaks
NA	not analysed
F	estimated peak area

Analysed by

Checked by



TRACER RESEARCH CORPORATION

Job RADIAN (SACRAMENTO CA)

Date 12/3/87

Page 1a

2.65

5.01

5.89

standard conc.		CHCl ₃				1, 2 DCA				TCA					
		200		10		200		5							
response from		1 458712		1 1198358		1 457787		1 1627632							
sul injection		2 454514		2 1157689		2 443194		2 1617589							
		3 454514		3 1187592		3 452472		3 1571244							
RFs for this sheet		4.34 x 10 ⁻¹⁵		8.47 x 10 ⁻¹⁷		4.43 x 10 ⁻¹⁵		3.11 x 10 ⁻¹⁷							
sample	time	amt inj	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l	area	µg/l	mean
H ₂ O blank	1410	10	-	-	-	-	-	-	-	-	-	-	-	-	-
N ₂ blank	1435	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
N ₂ blank	1450	2000	-	-	-	-	-	-	-	-	-	-	-	-	-
in sample	1453	2000	225000	2.05	2.05	225000	2.001	225000	2.06	2.06	225000	2.0004	225000	2.0004	2.0004
in sample	1547	2000	225000	2.05	2.05	225000	2.001	225000	2.06	2.06	225000	2.0004	225000	2.0004	2.0004
56-28-HL-1	1631	2000	193331	1.4	1.4	3834440	0.2	235000	2.06	2.06	893418	0.01	1016324	0.02	0.01
56-28-HL-1	1648	2000	244928	1.5	1.5	4360013	0.2	225000	2.06	2.06	1016324	0.02	225000	2.004	2.0004
in sample	1705	2000	225000	2.05	2.05	225000	2.001	225000	2.06	2.06	225000	2.0004	225000	2.0004	2.0004
STD	1721	2000	481571			1203830		457976			1659202				
							</								

RF response factor

Notations: I interference with adjacent peaks

NA not analysed

E estimated peak area

Analysed by John Taugman

checked by

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/3/87

Page 16

7.11

7.82

10.14

		CCl ₄			TCE			EOB			PCE		
standard conc.		µg/l			µg/l			µg/l			µg/l		
response from		area			area			area			area		
10 µl injection		area			area			area			area		
RFs for this sheet		g/area			g/area			g/area			g/area		
sample	time	amt in j	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l
H ₂ O blank	1410	10	-	-	-	-	-	-	-	-	-	-	-
N ₂ blank	1425	1000	-	-	-	-	-	-	-	-	-	-	-
N ₂ blank	1440	2000	-	-	-	-	-	-	-	-	-	-	-
air sample	1453	2000	225000	2.0001	2.0001	225000	2.0001	2.0001	225000	2.0008	2.0008	225000	2.0002
air sample	1547	2000	225000	2.0001	2.0001	225000	2.0001	2.0001	225000	2.0008	2.0008	225000	2.0002
56.28-HL 8	1631	2000	225000	2.0001	2.0001	225000	2.0001	2.0001	225000	2.0008	2.0008	225000	2.0002
56.28-HL 8	1648	2000	225000	2.0001	2.0001	225000	2.0001	2.0001	225000	2.0008	2.0008	225000	2.0002
air sample	1705	2000	225000	2.0001	2.0001	225000	2.0001	2.0001	225000	2.0008	2.0008	225000	2.0002
Std	1721	2000	248313			1300792			3073362			2152408	

Notations: I
NA
E

RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Tanguen

Checked by _____

Job Radian (Sacramento CA)

Date 12/3/87 Page 12
734

734
page 1c

[illegible]

Notations:	RF	response factor
I	I	interference with adjacent peaks
NA	NA	not analysed

Analysed by John Longman

Checked by

Job Radian (Sacramento, CA)

Date 12/3/87

Page 1

1.28

[illegible]

Analysed by John Tanager
Checked by _____



TRACER RESEARCH CORPORATION

Job RADIAN (SACRAMENTO, CA)

Date 12/3/87

Page 1

.46

1.34

1.7

3.04

standard conc.		CO ₂			O ₂			N ₂			CH ₄		
		area	µg/l	µg/l	area	µg/l	µg/l	area	µg/l	µg/l	area	µg/l	µg/l
response from sul injection	1	799089	area	89600	1	801238	area	1	7601730	area	1	1132374	area
	2	793782	area		2	709422	area	2	7259288	area	2	1055015	area
	3	798315	area		3	711564	area	3	7305865	area	3	1078762	area
RFs for this sheet		3.31 x 10 ⁻¹⁰			1.21 x 10 ⁻¹⁰			1.00 x 10 ⁻¹⁰			2.65 x 10 ⁻¹¹		
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l
H ₂ blank	1403	1000	-	-	-	-	-	-	-	-	-	-	-
H ₂ blank	1407	2000	-	-	-	-	-	-	-	-	-	-	-
an sample	1434	1200	<100000	<33000	<33000	249579	300000	300000	9431564	940000	740000	<100000	<2600
anote-blk	1545	1000	<100000	<33000	<33000	2491010	300000	300000	9461128	950000	750000	<100000	<2600
56-28-1118	11636	1000	283388	94000	93000	1732609	210000	220000	8844846	880000	920000	<100000	<2600
56-28-1118	11641	1000	278604	92000	92000	1824410	220000	220000	8557762	760000	750000	<100000	<2600
an sample	1655	1000	<100000	<33000	<33000	1947111	240000	240000	7510001	750000	750000	<100000	<2600
Std	1649	1000	790680			701054			7387503			1074327	

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Fargnoli
checked by

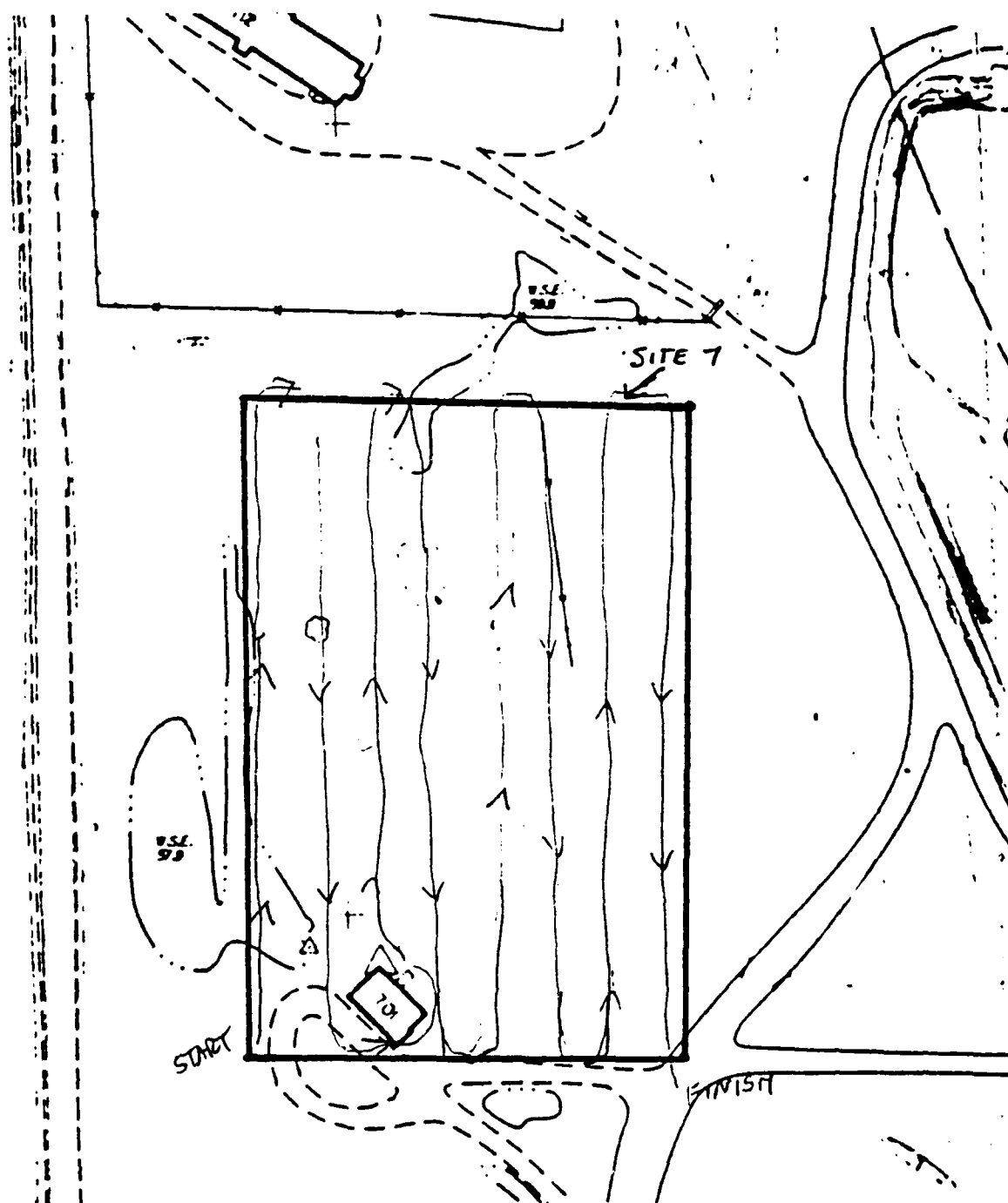
APPENDIX C

Emission Screening Field Notes,
Observations and Maps

Note: This appendix contains field test observation sheets and presents the walking patterns performed during the surface monitoring of landfills Nos. 7, 8, 10, 11, 12, 13, 14, 22, 38, 42, 43, and 69. Surface monitoring was not required for the remediated sites in Area D.

Key Map 8.

Site 7.



0945 ARRIVED ON SITE

SET UP OVA

PRE CALIBRATION - UP AIR - 5 PPM

482 PPM METHANE - 95 PPM

WIND - SOUTH 3-5 MPH

INITIAL BACKGROUND READING - 4 PPM

FINAL " " - 2.5 PPM

NO READINGS GREATER THAN 4 PPM, FINISH 10:37

Key Map 8.

Site 8.

SITE 8

Soil &
Concent
Piles

NR

Pit
225' deep

START 11:15

11:45

SOIL MOIST

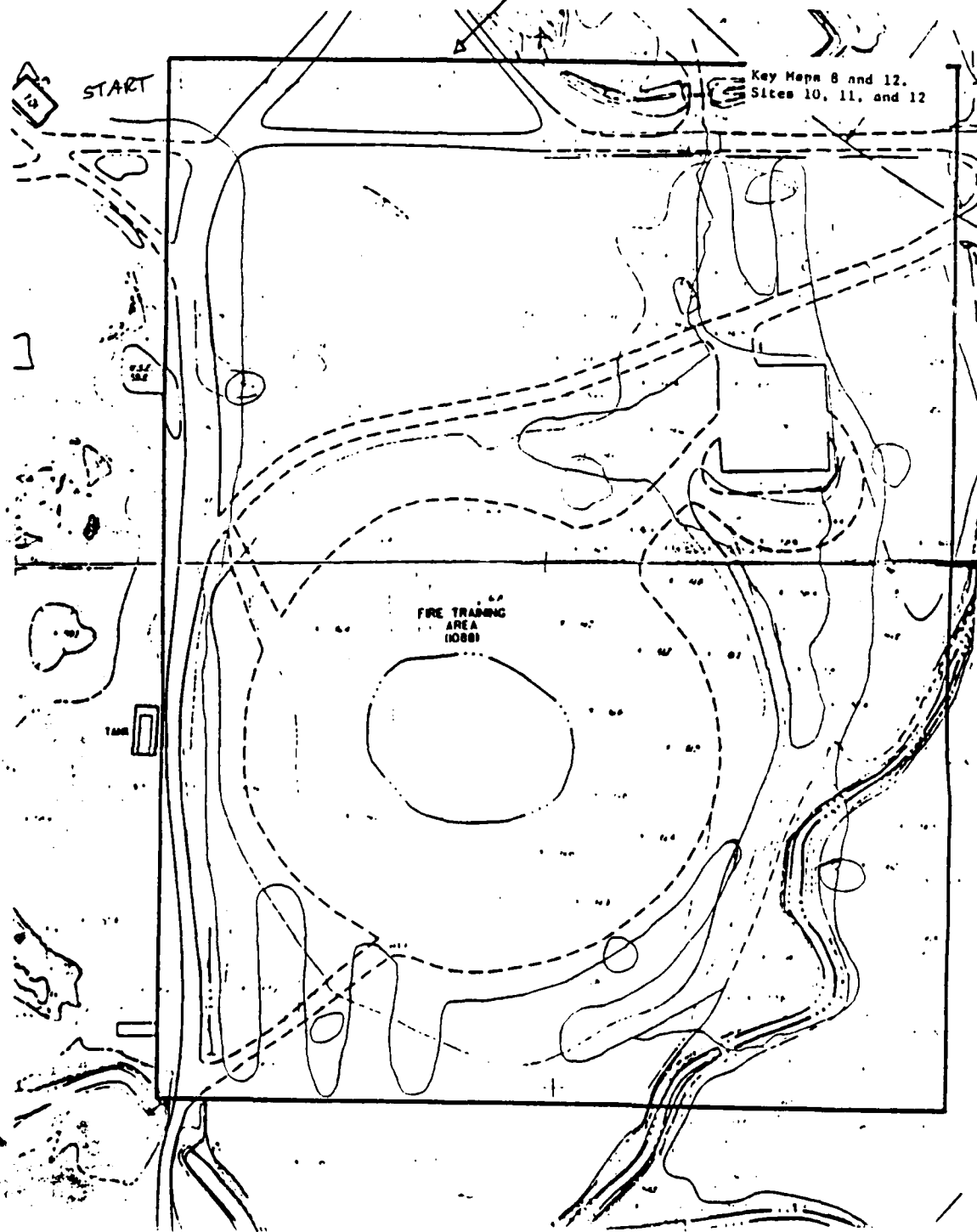
Wind
WEST
2.5 mph

Background 2.5

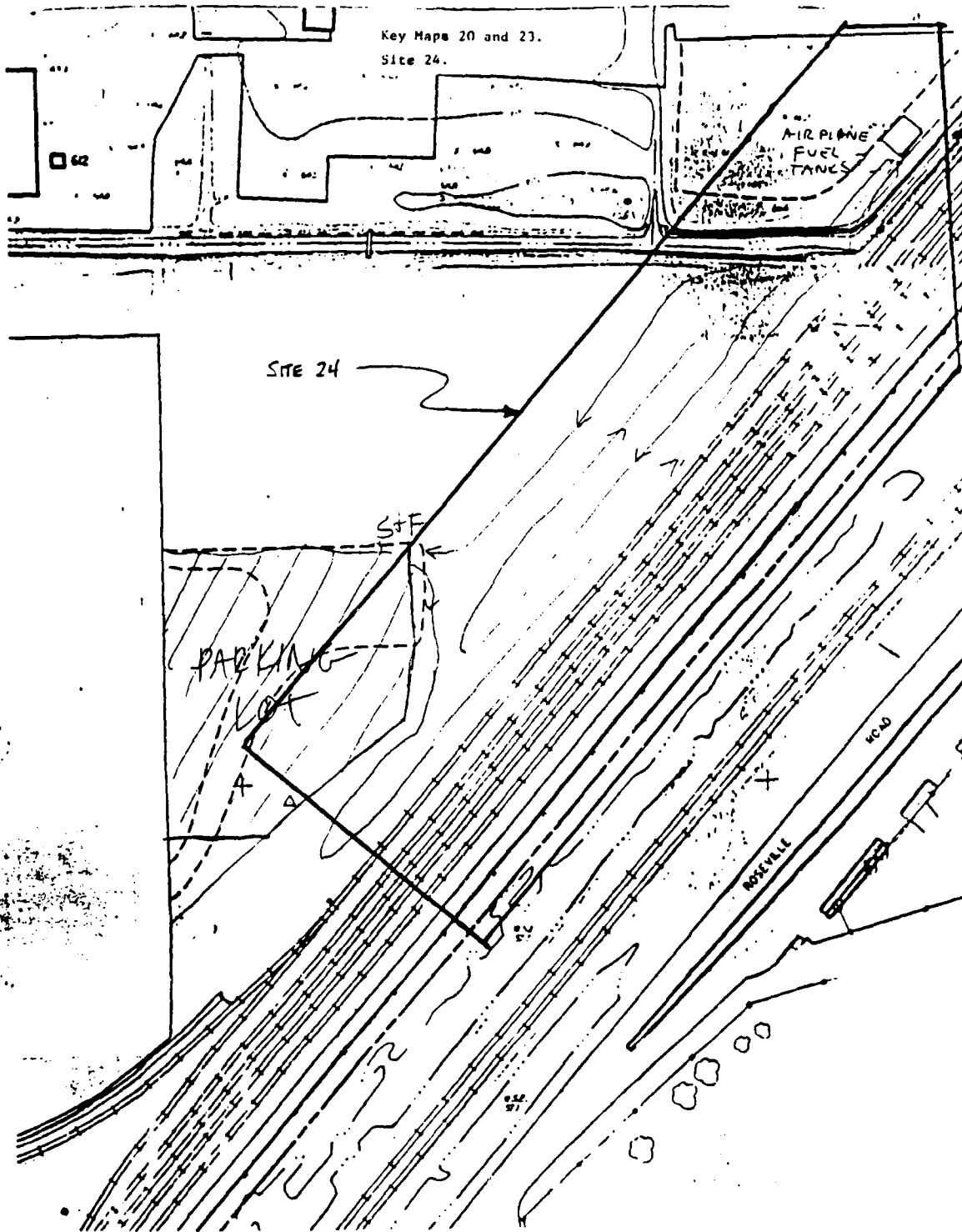
W.S.
S.R.

START 10 40
INITIAL BACKGROUND 2.5 PPM
FINAL " 2.5 PPM
NO READINGS OVER 3 PPM
SOIL MOIST

SITES 10, 11 and 12



START 1350
BACKGROUND 3.0
FINISH 1420
BACKGROUND 3.0
SOIL MOIST
NO READINGS ABOVE 35



SITES 22 + 42

START - 12:50

BACKGROUND 3.0 PPM

FINISH - 13:20

BACKGROUND 3.0 ppm

SITE 22 SOIL MOIST, LOTS OF STANDING
WATER AND MUD

SITE 42 MOSTLY PAVED OR
UNDER EVAPORATION POND,
A FEW GRAVEL & DIRT AREAS

NO READINGS ABOVE 3.5 ppm

SITE 69 SEE MAP ON NEXT PAGE

START 1320

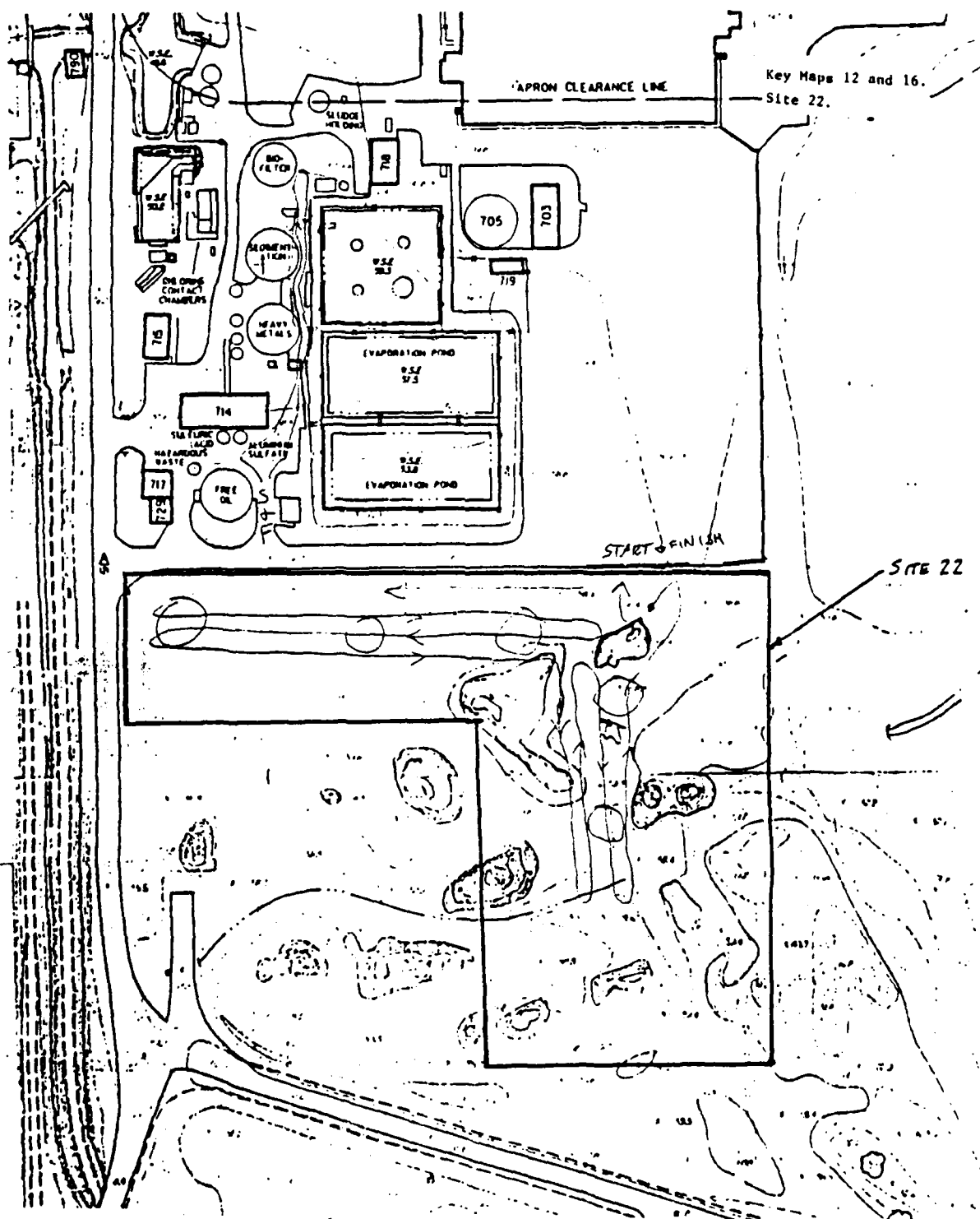
BACKGROUND 30 PPM

FINISH

BACKGROUND 3.0 ppm

NO READINGS OVER 3.5 PPM

SOIL MOIST



See 38

MOST PAVED, ~~25~~ - GRAVEL AREAS
NO READINGS OVER 3.5 PPM

[illegible]

START

13+14

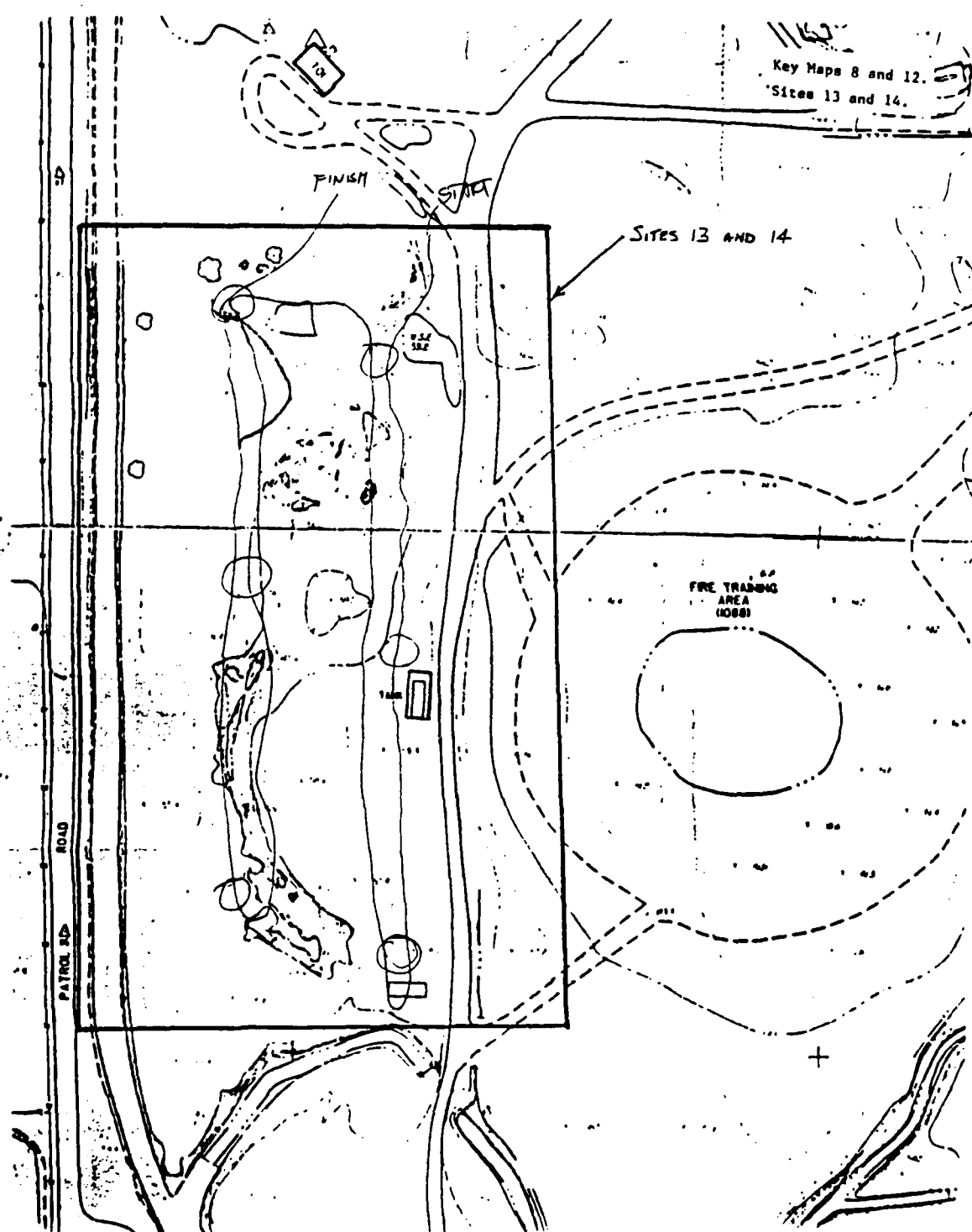
START 1204
BACKGROUND 2.5 PPM
FINISH 1230
BACKGROUND 2.5 PPM

NO READINGS ABOVE 3 PPM
SOIL MOIST

SITE 43, START 1236
BACKGROUND 3.0 PPM
FINISH 1247
BACKGROUND 3.0 PPM

NO READINGS ABOVE 4 PPM
SOIL MOIST

SEE MAP
ON PREVIOUS
PAGE



Instrument: 7

ORGANIC VAPOR ANALYZER 8/10/2016 QUALITY CONTROL CHECK

Calibration Species: Methane

		PRETEST QC CHECK				POSTEST QC CHECK				DRIFT	
		Low Level				High Level					
Date	Time	Initials	Input Conc.	Measured Conc.	Zero Corrected	Input Conc.	Measured Conc.	Input Conc.	Measured Conc.	URP Zero	High Level
2-9	0509	ADW	100	100	100	100	100	100	100	NOT	USE
2-10	0512	ADW	100	100	100	100	100	100	100	NOT	USE
* 2-11	0522	ADW	100	100	100	100	100	100	100	21	10,000
2-12	0522	ADW	100	100	100	100	100	100	100	21	10,000
2-13	0526	ADW	100	100	100	100	100	100	100	21	10,000

MULTIPOINT CALIBRATION DATA

Had to make internal adj.

		0		1		2		3		4		5		Correlation Coefficient (r)
Date	Time	Initials	Input Conc.	Inst. Response	Zero Correct.	Input Conc.	Inst. Response	Input Conc.	Inst. Response	Input Conc.	Inst. Response	Input Conc.	Inst. Response	
11/25	1700	FOW	00	10	10	100	100	100	100	100	100	100	100	
11/23	1700	FOW	00	4	10.2	12	100	100	100	100	100	100	100	

Zero Correction - For OVA response ≤ 30 ppm, subtract the zero response before calculating % error or correlation coefficient.
 Error (%) = $\frac{\text{Measured Conc.} - \text{Input Conc.}}{\text{Input Conc.}} \times 100$. Acceptance criterion is $\pm 10\%$ for Error $\leq 20\%$.
 Zero drift = $\frac{\text{Posttest Conc.} - \text{Pretest Conc.}}{\text{Pretest Conc.}}$, expressed in ppm. Acceptable if drift ≤ 20 ppm.
 High level drift = $\frac{\text{Posttest Conc.} - \text{Pretest Conc.}}{\text{Pretest Conc.}}$, expressed in %, acceptable if drift $\leq 20\%$.

710 RADIAN (SACRAMENTO, CA)

Date 12/4/87

Page 1

CONDENSED DATA

[illegible]

Notations: RF I NA E

response factor
interference with adjacent peaks
not analysed
estimated peak area

Analysed by

Job CADIAN (SACRAMENTO, CA)

Date 12/4/87

Page 2

CONDENSED DATA

[illegible]

RF

Notations: 1

response factor

interference with adjacent peaks

not analysed

Analysed by

Chemical by

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87

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4.96

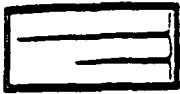
5.26

5.84

		CH_2Cl_2		$CHCl_3$		1,2-DCA		PCA	
standard conc.		200		10		200		5	
10 ul injection	response from	area	µg/l	area	µg/l	area	µg/l	area	µg/l
		area		area		area		area	
		area		area		area		area	
RFs for this sheet		4.24×10^{-15}		9.74×10^{-17}		4.22×10^{-15}		3.64×10^{-17}	
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l
H_2O blank	827	10	—	—	—	—	—	—	—
N_2 blank	933	1000	—	—	—	—	—	—	—
N_2 blank	900	2000	25000	2.05	2.05	25000	2.05	25000	2.05
N_2 blank	914	2000	25000	2.05	2.05	25000	2.05	25000	2.05
air sample	730	2000	25000	2.05	2.05	25000	2.05	25000	2.05
duplex blank	1017	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-3-HP 5.25	1024	2000	25000	2.05	2.05	25000	2.05	25000	2.05
56-3-HP 5.25	1024	2000	25000	2.05	2.05	25000	2.05	25000	2.05
56-4-HP 5.5	1107	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-4-HP 5.5	1121	2000	25000	2.05	2.05	25000	2.05	25000	2.05
56-4-HP 5.5	1137	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-4-HP 5.5	1152	2000	25000	2.05	2.05	25000	2.05	25000	2.05
56-6-13L 5	1307	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-6-13L 5	1321	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-6-13L 5	1337	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-7-13P 5	1420	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-7-13P 5	1420	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-8-7L 7.5	1619	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-8-7L 7.5	1713	1000	25000	2.05	2.05	25000	2.05	25000	2.05
56-8-7L 7.5	1729	500	25000	2.05	2.05	25000	2.05	25000	2.05

Analysed by John Tangema
Checked by _____

RF response factor
I interference with adjacent peaks
NA not analysed
F estimated peak area



TRACER RESEARCH CORPORATION

Job RANIAN (SACRAMENTO, CA)

Date 12/4/87

Page 16
6.03

7.08

7.76

10.06

standard conc.		CCl ₄			TCE			EDB			PCE		
		area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
response from 10 ul injection	1	1753747	area		1	1163435	area	1	2795798	area	1	2400000	area
	2	1783004	area		2	1215576	area	2	2524467	area	2	2353740	area
	3	1743846	area		3	1108673	area	3	2413676	area	3	2350000	area
RFs for this sheet		area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
sample	time	amt in											
H ₂ O blank	827	10											
N ₂ blank	842	1000											
N ₂ blank	900	2000											
air sample	914	2000											
oxygen blank	930	2000											
56-3-14P.525	1013	1000											
56-3-14P.525	1034	2000											
56-4-14P.55	1107	1000											
56-4-14P.55	1121	2000											
56-5-13P.5	1137	1000											
56-5-13P.5	1152	2000											
56-6-13L.5	1307	1000											
56-6-13L.5	1321	1000											
56-7-13P.5	1337	1000											
56-7-13P.5	1420	1000											
Std	1619	10											
56-8-7L.7.5	1713	100											
56-8-7L.7.5	1729	50											

Analysed by John Kengeman

Checked by

RF response factor
I interference with adjacent peaks
NA not analysed

mat peak

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87

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		BENZENE																	
standard conc.		500			µg/l			µg/l			µg/l			µg/l			µg/l		
response from		1 1000000 E			area			area			area			area			area		
10ul injection		2 1000000 E			area			area			area			area			area		
		3 11000000 E			area			area			area			area			area		
RFs for this sheet		4.84 x 10 ⁻⁵			g/area			g/area			g/area			g/area			g/area		
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l
H ₂ O blank	827	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N ₂ blank	842	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N ₂ blank	900	2000	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2
air sample	914	2000	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2
system blank	930	2000	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2
SG-3-HP 5.25	1013	1000	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5
SG-3-HP 5.25	1034	2000	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2
SG-4-HP 5.5	1107	1000	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5
SG-4-HP 5.5	1121	2000	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2
SG-5-13P 5	1137	1000	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5
SG-5-13P 5	1150	2000	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2	4.2	100000	4.2
SG-6-13L 5	1307	1000	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5
SG-6-13L 5	1321	1000	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5	4.5	100000	4.5
SG-7-13P 5	1337	1000	500000 E	2	2	500000 E	2	2	500000 E	2	2	500000 E	2	2	500000 E	2	2	500000 E	2
SG-7-13P 5	1421	1000	500000 E	2	2	500000 E	2	2	500000 E	2	2	500000 E	2	2	500000 E	2	2	500000 E	2
OTA	1620	10	100000 F	-	-	100000 F	-	-	100000 F	-	-	100000 F	-	-	100000 F	-	-	100000 F	-
SG-8-7L 7.5	1714	100	40000	4.5	4.5	40000	4.5	4.5	40000	4.5	4.5	40000	4.5	4.5	40000	4.5	4.5	40000	4.5
SG-8-7L 7.5	1730	50	40000	4.0	4.0	40000	4.0	4.0	40000	4.0	4.0	40000	4.0	4.0	40000	4.0	4.0	40000	4.0

Analysed by Jake Tangeman
Checked by _____

RF response factor
Notations: I interference with adjacent peaks
NA not analysed
F estimated peak area

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87

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standard conc.		VINYL CHLORIDE				µg/l				µg/l				µg/l			
response from		25				area				area				area			
100 ul injection		3392959				area				area				area			
		23581854				area				area				area			
		33428884				area				area				area			
RFs for this sheet		7.21X10 ⁻¹⁶				g/area				g/area				g/area			
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	area	µg/l	area	mean
N ₂ blank	842	1000	2100000	2.07	2.07												
N ₂ blank	900	2000	2100000	2.04	2.04												
air sample	914	2000	2100000	2.04	2.04												
system blank	930	2000	2100000	2.04	2.04												
SG-3-HP 5.25'	1013	1000	2100000	2.07	2.04												
SG-3-HP 5.25'	1034	2000	2100000	2.04													
SG-4-14P 5.5'	1107	1000	2100000	2.07	2.04												
SG-4-14P 5.5'	1121	2000	2100000	2.04													
SG-5-13P 5'	1137	1000	2100000	2.07	2.04												
SG-5-13P 5'	1152	2000	2100000	2.04													
SG-6-12L 5'	1307	1000	2100000	2.07	2.07												
SG-6-12L 5'	1321	1000	2100000	2.07													
SG-7-13P 5'	1337	1000	1685168	12	12												
SG-7-13P 5'	1421	1000	1742000	13													
STD			2933486														
SG-8-7L 7.5'	1714	100	679749	5	5												
SG-8-7L 7.5'	1730	50	351080	5													
air sample	1804	2000	2100000	2.04	2.04												

Analysed by John Tangeman

RF Notations: I

response factor

interference with adjacent peaks

not analysed

estimated peak area

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87

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1.29

1.65

2.95

		CO ₂			O ₂			N ₂			C ₂ H ₄		
standard conc.		area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
response from		1	857147	area	1	789191	area	1	7704567	area	1	1185793	area
1000 µl injection		2	813163	area	2	737349	area	2	27241428	area	2	1128956	area
		3	789689	area	3	732636	area	3	37133774	area	3	1123252	area
RFs for this sheet		3.22 x 10 ⁻¹¹	g/area	mean	1.19 x 10 ⁻¹⁰	g/area	mean	1.00 x 10 ⁻¹⁰	g/area	mean	2.53 x 10 ⁻¹¹	g/area	mean
sample	time	amt [in]	area	µg/l	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H ₂ O blank	829	1000	—	—	—	—	—	—	—	—	—	—	—
H ₂ O blank	836	2000	211000	21600	210000	25900	25900	210000	25000	25000	210000	25000	21300
air sample	916	1000	119864	119864	2559286	300000	300000	9428924	950000	950000	100000	21300	21300
system blank	935	1000	186932	186932	2460893	290000	290000	9552891	960000	960000	100000	21300	21300
SG-3-Hp 5.25	1014	1000	450000	450000	247462	290000	280000	9810603	990000	990000	100000	21300	21300
SG-3-Hp 5.25	1031	1000	519808	519808	2266601	270000	270000	8753106	880000	880000	100000	21300	21300
SG-4-Hp 5.5	1105	1000	126346	126346	2111421	250000	260000	9474389	950000	950000	100000	21300	21300
SG-4-Hp 5.5	1112	1000	114517	114517	2218088	260000	260000	875757	930000	930000	100000	21300	21300
SG-5-13p 5	1136	1000	519449	519449	87564	100000	120000	9791916	980000	980000	100000	21300	21300
SG-5-13p 5	1140	1000	494778	494778	1075858	130000	130000	9730807	990000	990000	100000	21300	21300
SG-6-13L 5	1243	1000	126233	126233	209275	250000	240000	953365	960000	960000	100000	21300	21300
SG-6-13L 5	1308	1000	91675	91675	2015715	240000	240000	928791	930000	930000	100000	21300	21300
SG-7-13p	1337	1000	1291018	1291018	358108	430000	610000	617386	620000	620000	1855606	47000	4600
SG-7-13p	1347	1000	1242644	1242644	659432	790000	790000	6262806	630000	630000	1789431	45000	45000
SD	1411	1000	773686	773686	728935	—	—	6943111	—	—	1071184	—	—
SG-8-7L 7.5	1751	1000	1059569	1059569	1213956	120000	120000	7397336	740000	750000	773176	20000	20000
SG-8-7L 7.5	1755	1000	1068948	1068948	1043333	120000	120000	7572319	760000	760000	778282	20000	20000
air sample	1758	1000	125000	125000	256054	300000	300000	9519335	960000	960000	400000	21300	21300

Analysed by Johanna Tangemann
Checked by _____

RF response factor
I interference with adjacent peaks
NA not analysed
F estimated peak area

Notations:

Job RADIAN (SACRAMENTO, CA)

Date 12/4/87 Page 2a

[illegible]

Notations:	RF	response factor
I	interference with adjacent peaks	
NA	not analysed	
F	estimated peak area	

Analysed by John Tangeman

[illegible]

Notations:

RF	response factor
I	interference with adjacent peaks
NA	not analysed
E	estimated peak area

Analysed by John Tingen
Checked by

JOJO KADIAN (SACRAMENTO, CA)

Date 12/5/87

Page 1

CONDENSED DATA

[illegible]

Notations:

RF	response factor
I	interference with adjacent peaks
NA	not analysed
E	estimated peak area

Analysed by John Pangemanan
Checked by _____

Job RADIANT (SACRAMENTO, CA)

Date 12/5/87 Page 2

Page 2

CONDENSED DATA

[illegible]

Notations:

response factor
interference with
not analysed
estimated peak a

peaks

Analysed by John Targeman

Checked by

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87

Page 1a

4.95

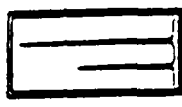
5.25

5.82

		CH ₂ Cl ₂		CHCl ₃		DCA		TCA	
standard conc.		200		10		200		5	
response from 10ul injection		area		area		area		area	
		µg/l		µg/l		µg/l		µg/l	
1	493404	area		area		area		area	
2	478528	area		area		area		area	
3	444947	area		area		area		area	
RFs for this sheet		4.23 X 10 ⁻¹⁵		8.53 X 10 ⁻¹⁷		4.28 X 10 ⁻¹⁵		3.08 X 10 ⁻¹⁷	
sample	Time	amt in	µg/l		mean	µg/l		mean	µg/l
			area	µg/l		area	µg/l		
N ₂ blank	612	1000							
N ₂ blank	625	2000							
air sample	735	2000	225000	2.05	2.05	225000	2.05	2.05	2.05
oxygen blank	806	2000	225000	2.05	2.05	225000	2.05	2.05	2.05
S6-9-7L 7'	859	1000	225000	2.05	2.05	225000	2.05	2.05	2.05
S6-9-7L 7'	927	1000	225000	2.05	2.05	225000	2.05	2.05	2.05
S6-10-7L 6'	1009	1000	225000	2.05	2.05	225000	2.05	2.05	2.05
S6-10-7L 6'	1023	100	225000	2.05	2.05	225000	2.05	2.05	2.05
S6-11-7L 7.5'	1114	50	179303	1.5	1.5	179303	1.5	1.5	1.5
S6-11-7L 7.5'	1129	100	406766	1.7	1.7	406766	1.7	1.7	1.7
S6-12-7L 8'	1206	500	1098822	9	9	1098822	9	9	9
S6-12-7L 8'	1221	500	1045455	9	9	1045455	9	9	9
S6-13-7L 2'	1306	1000	108701	0.5	0.5	108701	0.5	0.5	0.5
S6-13-7L 2'	1321	1000	115243	0.5	0.5	115243	0.5	0.5	0.5
S6-14-10P 4'	1438	1000	225000	2.05	2.05	225000	2.05	2.05	2.05
S6-14-10P 4'	1452	2000	225000	2.05	2.05	225000	2.05	2.05	2.05

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Tangeman
Checked by _____



TRACER RESEARCH CORPORATION

Job KADIAN (SACRAMENTO, CA)

Date 12/5/87

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5.94

7.01

7.71

standard conc.		CC14		TCE		EDB		PCE	
		2		10		20		5	
response from		area		area		area		area	
10ul injection		area		area		area		area	
RFs for this sheet		g/area		g/area		g/area		g/area	
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l
N ₂ blank	612	1000							
N ₂ blank	625	2000							
air pump	735	2000							
system blank	806	2000							
SG-9-7L 7'	857	1000							
SG-9-7L 7'	727	1000							
SG-10-7L 6'	1009	1000							
SG-10-7L 6'	1123	1000							
SG-11-7L 7.5'	1114	50							
SG-11-7L 7.5'	1129	100							
SG-12-7L 8'	1206	500							
SG-12-7L 8'	1201	500							
SG-13-7L 2'	1304	1000							
SG-13-7L 2'	1321	1000							
SG-14-10P 4'	1438	1000							
SG-14-10P 4'	1452	2000							

Analysed by John Tangeman

Checked by

RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87

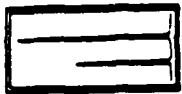
Page 1c

7.23

standard conc.		BEN7ENE				µg/l				µg/l				µg/l			
response from		500				1/30000000				1				1			
10ul injection		2/2613571				area				2				2			
		3/11316779				area				3				3			
RFs for this sheet		4.06 x 10 ⁻¹⁶				g/area				g/area				g/area			
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	area	µg/l	mean	area
N ₂ blank	612	1000															
N ₂ blank	625	2000	2100000	4.02	4.02												
air sample	735	2000	2100000	4.02	4.02												
Dye blank	806	2000	2100000	4.02	4.02												
S6-9-76, 7'	859	1000	2100000	2.04	2.04												
S6-9-76, 7'	927	1000	2100000	2.04	2.04												
S6-10-76, 6'	1009	1000	2100000	2.04	2.04												
S6-10-76, 6'	1023	100	2100000	2.4	2.4												
S6-11-76, 7.5'	1114	50	2100000	2.8	2.8												
S6-11-76, 7.5'	1129	100	2100000	2.4	2.4												
S6-12-76, 8'	1206	500	2100000	2.08	2.08												
S6-12-76, 8'	1221	500	2100000	2.08	2.08												
S6-13-76, 2'	1306	1000	2100000	2.04	2.04												
S6-13-76, 2'	1321	1000	2100000	2.04	2.04												
S6-14-76, 4'	1406	100	1040000														
S6-14-76, 4'	1438	1000	2100000	2.04	2.04												
S6-14-76, 4'	1452	2000	2100000	2.02	2.02												

Notations: I RF response factor
NA interference with adjacent peaks
E not analysed
estimated peak area

Analysed by John Tangeman
Checked by _____



TRACER RESEARCH CORPORATION

Job RADIAN (SACRAMENTO, CA)Date 12/5/87Page 1

standard conc.		VINYL CHLORIDE										µg/l		µg/l		µg/l			
response from		1		2		3		1		2		3		1		2		3	
100ul injection		324		3484		342		2168		2		3		332		1188		3	
RFs for this sheet		7.5 / x 10 ⁻¹⁶		g/area		µg/l		area		µg/l		area		µg/l		area		µg/l	
sample	time	am	in	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l	area
N ₂ blank	612	1000																	
N ₂ blank	625	2000			2.04	2.04													
air sample	735	2000			2.04	2.04													
oxygen blank	806	2000			2.04	2.04													
SG-9-7L 7'	859	1000			0.2	0.2													
SG-9-7L 7'	907	1000			0.2	0.2													
SG-10-7L 8'	1009	1000			0.3	0.2													
SG-10-7L 6'	1023	100			0.2	0.2													
SG-11-7L 7.5'	1114	50			3	4													
SG-11-7L 7.5'	1129	100			4	4													
SG-12-7L 8'	1206	500			2.2	2.2													
SG-12-7L 8'	1221	500			2.2	2.2													
SG-13-7L 2'	1306	1000			2.08	2.08													
SG-13-7L 2'	1321	1000			2.08	2.08													
STD	1334	100																	
SG-14-10p 4'	1438	1000			2.08	2.08													
SG-14-10p 4'	1452	2000			2.04	2.04													

Analysed by John Tangeman

Checked by _____

Job RADIAN (SACRAMENTO, CA)

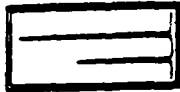
TRACER RESEARCH CORPORATION

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		CO ₂				O ₂				N ₂				CH ₄			
standard conc.		26400		μg/l		89600		μg/l		739200		μg/l		28800		μg/l	
response from		1 780874		area		1 695047		area		1 7385598		area		1 1090112		area	
1000 ul injection		2 760457		area		2 680468		area		2 7231206		area		2 1065053		area	
		3 754698		area		3 685503		area		3 7219556		area		3 1065741		area	
RFs for this sheet		3.45 x 10 ⁻¹¹		g/area		1.30 x 10 ⁻¹⁰		g/area		1.02 x 10 ⁻¹⁰		g/area		2.68 x 10 ⁻¹¹		g/area	
sample	time	amt in.]	area	μg/l	mean	area	μg/l	mean	area	μg/l	mean	area	μg/l	area	μg/l	mean	area
H ₂ blank	722	1000	225000	2860	2860	2396062	2310000	2310000	932857	940000	940000	235000	2670	235000	2670	2670	2670
H ₂ blank	726	2000	225000	2860	2860	2316047	3000000	3000000	8977669	910000	910000	235000	2670	235000	2670	2670	2670
Dist. sample	730	1000	225000	2860	2860	2316047	3000000	3000000	9059195	920000	920000	235000	2670	235000	2670	2670	2670
Dist. sample	828	1000	225000	2860	2860	2316047	3000000	3000000	9059195	920000	920000	235000	2670	235000	2670	2670	2670
SC-7L 7'	940	1000	314898	11000	11000	1550296	2000000	2000000	8800532	890000	890000	235000	2670	235000	2670	2670	2670
SC-9-7L 7'	944	1000	313774	11000	11000	1550296	2000000	2000000	8800532	890000	890000	235000	2670	235000	2670	2670	2670
SC-10-7L 6'	1000	1000	490923	17000	16200	957002	1200000	1400000	9109337	932000	932000	235000	2670	235000	2670	2670	2670
SC-10-7L 6'	1005	1000	437429	15000	15000	1129250	1500000	1500000	9086606	920000	920000	235000	2670	235000	2670	2670	2670
SC-11-7L 7.5'	1106	1000	1771737	61000	62000	146112	19000	22000	4770672	480000	480000	235000	2670	235000	2670	2670	2670
SC-11-7L 7.5'	1110	1000	1505609	62000	62000	186265	240000	240000	4773510	480000	480000	235000	2670	235000	2670	2670	2670
SC-12-7L 8'	1159	1000	599098	21000	20000	872156	110000	120000	8802226	890000	890000	235000	2670	235000	2670	2670	2670
SC-12-7L 8'	1203	1000	583143	20000	20000	991837	130000	130000	8813498	900000	900000	235000	2670	235000	2670	2670	2670
SC-13-7L 2'	1259	1000	36841	1300	1300	2272845	300000	300000	9072989	920000	920000	235000	2670	235000	2670	2670	2670
SC-13-7L 2'	1302	1000	38166	1300	1300	2237465	290000	290000	9040664	920000	920000	235000	2670	235000	2670	2670	2670
SC-14-10.4'	1428	1000	749788	2860	2860	696268	890000	890000	7338181	920000	920000	235000	2670	235000	2670	2670	2670
SC-14-10.4'	1433	1000	225000	2860	2860	235360	300000	300000	9045448	920000	920000	235000	2670	235000	2670	2670	2670
SC-14-10.4'	1433	1000	225000	2860	2860	2287776	300000	300000	9003868	910000	910000	235000	2670	235000	2670	2670	2670

Notations: RF 1 response factor
NA interference with adjacent peaks
E not analysed
estimated peak area

Analysed by John Langman
Checked by _____



TRACER RESEARCH CORPORATION

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standard conc. response from ul injection	<u>CH₂Cl₂</u>			<u>CHCl₃</u>			<u>1,2 DCA</u>			<u>TCA</u>		
	µg/l			µg/l			µg/l			µg/l		
	1	2	3	1	2	3	1	2	3	1	2	3
RFs for this sheet												
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area
SG-15-10P6	1523	1000	225000	2.1	2.1	225000	2.1	2.1	225000	2.0008	2.0	225000
SG-15-10P6	1537	1000	225000	2.1	2.1	225000	2.1	2.1	225000	2.0008	2.0	225000
SG-16-10P6	1558	1000	225000	2.1	2.1	225000	2.1	2.1	225000	2.0008	2.0	225000
SG-16-10P6	1613	1000	225000	2.1	2.1	225000	2.1	2.1	225000	2.0008	2.0	225000
SG-17-11P6	1633	1000	225000	2.1	2.05	225000	2.1	2.05	225000	2.0008	2.0	225000
SG-17-11P6	1649	2000	225000	2.05	2.05	225000	2.05	2.05	225000	2.0004	2.0	225000
SG-17-11P6	1708	2000	225000	2.05	2.05	225000	2.05	2.05	225000	2.0004	2.0	225000
SG-17-11P6	1720	10	706412			1344280			954182			1751074

Analysed by John TugenerRF response factor
Notations: I interference with adjacent peaks
NA not analysed
estimated peak area

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

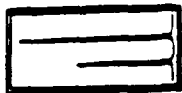
Date 12/5/87

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standard conc.		CCl ₄				TCE				EDB				PCE			
		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
response from ul injection		area		area		area		area		area		area		area		area	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
RFs for this sheet		q/area		q/area		q/area		q/area		q/area		q/area		q/area		q/area	
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l
S6-15-10P, 6'	1513	1000	225000	2.0002	2.0002	225000	2.0002	225000	2.0002	2.0002	225000	2.0002	225000	2.0002	2.0002	225000	2.0002
S6-15-10P, 6'	1537	1000	225000	2.0002	2.0002	225000	2.0002	225000	2.0002	2.0002	225000	2.0002	225000	2.0002	2.0002	225000	2.0002
S6-16-10P, 6'	1558	1000	225000	2.0002	2.0002	225000	2.0002	225000	2.0002	2.0002	225000	2.0002	225000	2.0002	2.0002	225000	2.0002
S6-16-10P, 6'	1613	1000	225000	2.0002	2.0002	225000	2.0002	225000	2.0002	2.0002	225000	2.0002	225000	2.0002	2.0002	225000	2.0002
S6-17-11P, 6'	1633	1000	225000	2.0002	2.0001	225000	2.0002	225000	2.0002	2.0008	225000	2.0002	225000	2.0002	2.0005	225000	2.0002
S6-17-11P, 6'	1649	2000	225000	2.0001	2.0001	225000	2.0008	225000	2.0008	2.0005	225000	2.0008	225000	2.0005	2.0002	225000	2.0002
air sample	1708	2000	225000	2.0001	2.0001	225000	2.0008	225000	2.0008	2.0005	225000	2.0008	225000	2.0005	2.0005	225000	2.0002
Std	1722	10	1674574			1500746										2700000	

Notations: RF
I response factor
NA interference with adjacent peaks
F not analysed
estimated peak area

Analysed by Johanna Tangema
Checked by _____



TRACER RESEARCH CORPORATION

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standard conc.		BENZENE			µg/l			µg/l			µg/l		
		500			area			area			area		
response from ul injection		1			2			3			1		
		area			area			area			area		
RFs for this sheet		q/area			µg/l			q/area			µg/l		
		mean			area			mean			area		
sample	time	amt in	area	µg/l	area	µg/l	area	mean	µg/l	area	mean	µg/l	area
SG-15-10P 6'	1523	1000	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000
SG-15-10P 6'	1537	1000	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000
SG-16-10P 6'	1558	1000	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000
SG-16-10P 6'	1613	1000	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000
SG-17-11P 6'	1633	1000	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000	2.04	2100000
SG-17-11P 6'	1649	2000	2100000	2.02	2100000	2.02	2100000	2.02	2100000	2.02	2100000	2.02	2100000
air sample	1708	2000	2100000	2.02	2100000	2.02	2100000	2.02	2100000	2.02	2100000	2.02	2100000
STD	1720	10	9710100										

Notations: RF response factor
1 interference with adjacent peaks
NA not analysed
mat material peak

Analysed by John Tanguay

Checked by

Job RADIAN (SACRAMENTO, CA)

Date 2/5/87 Page 2

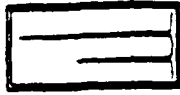
standard conc.		VINYL CHLORIDE		µg/l		µg/l		µg/l	
response from ul injection		1	area	1	area	1	area	1	area
		2	area	2	area	2	area	2	area
		3	area	3	area	3	area	3	area
RFs for this sheet		q/area		q/area		q/area		q/area	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	µg/l
SG-15-10P6	1523	1000	2100000	2.08	2.08				
SG-15-10P6	1537	1000	2100000	2.08	2.08				
SG-16-10P6	1558	1000	2100000	2.08	2.08				
SG-16-10P6	1613	1000	2100000	2.08	2.08				
SG-17-11P6	1633	1000	2100000	2.08	2.04				
SG-17-11P6	1649	2000	2100000	2.04	2.04				
SG-17-11P6	1708	2000	2100000	2.04	2.04				
SG-17-11P6	1742	700	2118557						

Analysed by John Tangleman
Checked by _____

Job RADIAN (SALPIMENTO, CA)

Date 12/15/82

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TRACER RESEARCH CORPORATION

		CO ₂				O ₂				Ab				CH ₄			
standard conc.		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
response from		area		area		area		area		area		area		area		area	
ul injection		area		area		area		area		area		area		area		area	
3		area		area		area		area		area		area		area		area	
RFs for this sheet		q/area		q/area		q/area		q/area		q/area		q/area		q/area		q/area	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-15-10P, 6'	1514	1000	65423	2300	2200	1972683	260000	260000	8446832	8600000	8600000	225000	2670	2670	225000	2670	2670
SG-15-10P, 6'	1518	1000	61048	2100	2100	2102494	270000	270000	8916945	9100000	9100000	225000	2670	2670	225000	2670	2670
SG-16-10P, 6'	1549	1000	73605	2500	2600	2058098	270000	270000	8805283	8900000	8900000	225000	2670	2670	225000	2670	2670
SG-16-10P, 6'	1554	1000	74636	2600	2600	2123168	280000	280000	8952783	9100000	9100000	225000	2670	2670	225000	2670	2670
SG-17-11P, 6'	1624	1000	531659	18000	17000	906251	120000	140000	9403205	9500000	9600000	225000	2670	2670	225000	2670	2670
SG-17-11P, 6'	1628	1000	44038	16000	16000	1152217	150000	150000	9439073	9600000	9600000	225000	2670	2670	225000	2670	2670
SG-17-11P, 6'	1700	1000	225000	2820	2860	2324853	300000	300000	9018817	9200000	9200000	225000	2670	2670	225000	2670	2670
SG-17-11P, 6'	1704	1000	723269			636604			6910074			1036534					

Notations: RF
I response factor
NA interference with adjacent peaks
not analysed
mat

Analysed by John Tangelman

Checked by



TRACER RESEARCH CORPORATION

Job RADIAN (SACRAMENTO, CA)

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5.88

5.30

5.00

		CHCl ₃		CHCl ₃		CHCl ₃		1,2 DCA		TCA	
standard conc.		200		10		200		200		5	
response from		area		area		area		area		area	
10 ul injection		area		area		area		area		area	
10 ul injection		area		area		area		area		area	
1		447388		1122757		1		433902		1	
2		441040		21145525		2		437898		2	
3		433442		31150216		3		439963		3	
4		454 X 10 ⁻¹⁵		8.78 X 10 ⁻¹⁷		4		458 X 10 ⁻¹⁵		3.45 X 10 ⁻¹⁷	
RFs for this sheet		g/area		g/area		g/area		g/area		g/area	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N ₂ blank	603	1000									
N ₂ blank	616	2000									
air sample	704	2000									
system blank	731	2000									
VW-3	804	1000									
VW-3	818	100									
VW-3	831	100									
VW-2	845	100									
VW-2	858	100									
VW-1	913	100									
VW-1	927	200									
VC-3-9	940	500									
VC-3-9	953	250									
VC-3-7	1007	1000									
VC-3-7	1021	2000									
Std	1036	10									
SG-18-438	1057	1000									
SG-18-438	1112	2000									

Analysed by John Langman

Checked by

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area



TRACER RESEARCH CORPORATION

Job RADIAN (SACRAMENTO, CA)

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standard conc.		VINYL CHLORIDE				µg/l				µg/l				µg/l				µg/l			
		500		25		µg/l		area		µg/l		area		µg/l		area		µg/l		area	
response from 100ul injection		1		1857334		area		1		area		1		area		1		area		1	
		2		1859253		area		2		area		2		area		2		area		2	
		3		1818916		area		3		area		3		area		3		area		3	
RFs for this sheet		1.35X10 ⁻¹⁵		q/area		q/area		q/area		q/area		q/area		q/area		q/area		q/area		q/area	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	
N ₂ blank	603	1000																			
N ₂ blank	616	2000	3100000	1.07	1.07																
an sample	704	2000	5100000	1.07	1.07																
system blank	731	2000	5100000	1.07	1.07																
VW-3	804	1000	1000000	1.07	1.07																
VW-3	818	100	1000000	1.07	1.07																
VW-3	831	100	1000000	1.07	1.07																
VW-2	845	100	1000000	1.07	1.07																
VW-2	858	100	1000000	1.07	1.07																
VW-1	913	100	1000000	1.07	1.07																
VW-1	927	200	1000000	1.07	1.07																
VC-3-9	940	500	1000000	1.07	1.07																
VC-3-9	953	250	1000000	1.07	1.07																
VC-3-7	1007	1000	1000000	1.07	1.07																
VC-3-7	1021	2000	1000000	1.07	1.07																
STD	1047	100	1597144																		
SC-18-13p.55	1057	1000	1000000	1.07	1.07																
SC-18-13p.55	1112	2000	1000000	1.07	1.07																

Analysed by John Ferguson
Checked by _____

RF response factor
I interference with adjacent peaks
NA not analysed
F estimated peak area

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

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standard conc.		CO ₂			O ₂			N ₂			CH ₄		
		26400	µg/l	area	89600	µg/l	area	739200	µg/l	area	28800	µg/l	area
response from		1 700789	area	831855	1 831855	area	6816415	1 6816415	area	1 999253	area	1 999253	area
100ul injection		2 703394	area	597778	2 597778	area	435827	2 435827	area	2 959374	area	2 959374	area
		3 718581	area	616415	3 616415	area	6594073	3 6594073	area	3 992376	area	3 992376	area
RFs for this sheet		3.73 x 10 ⁻¹¹	µg/l	mean	1.31 x 10 ⁻¹⁰	q/area	mean	1.12 x 10 ⁻¹⁰	q/area	2.93 x 10 ⁻¹¹	g/area	mean	g/area
sample	time	amt in	area	µg/l	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H ₂ blank	742	1000	100000	23700	23700	23700	23700	23700	23700	23700	23700	23700	23700
H ₂ blank	745	2000	50										
in sample	748	1000	100000	23700	23700	23700	23700	23700	23700	23700	23700	23700	23700
dyest-blk	752	1000	100000	23700	23700	23700	23700	23700	23700	23700	23700	23700	23700
VW-3	804	1000	44593	1700	1600	1600	1600	1600	1600	1600	1600	1600	1600
VW-3	807	1000	42293	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
VW-2	848	1000	25336	950	940	940	940	940	940	940	940	940	940
VW-2	851	1000	24692	920	920	920	920	920	920	920	920	920	920
VW-1	911	1000	210000	23700	23700	23700	23700	23700	23700	23700	23700	23700	23700
VW-1	915	1000	210000	23700	23700	23700	23700	23700	23700	23700	23700	23700	23700
VC-3-9	940	1000	161093	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
VC-3-7	1007	1000	78410	2900	2800	2800	2800	2800	2800	2800	2800	2800	2800
VC-3-7	1019	1000	74772	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800
SMA	1030	1000	635776		620720			615718			863717		
SC-18-43, 5.5	1054	1000	101480	3800	3700	3700	3700	3700	3700	3700	3700	3700	3700
SC-18-43, 5.5	1101	1000	97800	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
+ estimated peak area

Analysed by

Jordan Langman

Ch

JOHN R. ADRIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/7/87

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604

7.11

7.80

10.14

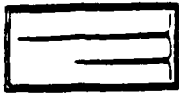
		CC14			TCE			EDB			PCE		
standard conc.		µg/l			µg/l			µg/l			µg/l		
response from		area			area			area			area		
10 µl injection		area			area			area			area		
RFs for this sheet		g/area			g/area			g/area			g/area		
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l
N ₂ blank	603	1000											
N ₂ blank	616	2000	225000	2.0001	2.0001	225000	2.0009	2.0009	225000	2.0008	2.0008	225000	2.0008
air sample	704	2000	138337	0.0007	0.0007	225000	2.0009	2.0009	225000	2.0008	2.0008	225000	2.0008
system blank	731	2000	205237	0.001	0.001	225000	2.0009	2.0009	225000	2.0008	2.0008	225000	2.0008
YW-3	804	1000	01 R			724873	0.05		225000	2.000		225000	2.0006
YW-3	818	100	530055	0.06	0.06	750000	0.06	0.06	225000	2.002	2.002	225000	2.006
YW-3	831	100	571116	0.06		75000	0.06		225000	2.002		225000	2.006
YW-2	845	100	2061071	0.2	0.2	610465	0.5	0.4	225000	2.02	2.02	225000	2.006
YW-2	858	100	1818487	0.2		522994	0.4		225000	2.02		225000	2.006
YW-1	913	100	142329	0.02	0.02	225000	2.02	2.009	225000	2.02	2.008	225000	2.006
YW-1	927	200	272693	0.01		225000	2.009		225000	2.008		225000	2.003
VC-3-9	943	500	225000	2.0005	2.0005	148067	0.02	0.2	225000	2.003	2.003	225000	2.001
VC-3-9	953	250	225000	2.001		750000	0.02		225000	2.007		225000	2.002
VC-3-7	1007	1000	225000	2.0003	2.0001	700000	0.005	0.006	225000	2.002	2.002	225000	2.0007
VC-3-7	1021	2000	225000	2.0001		1500000	0.006		225000	2.008		225000	2.007
SD	1036	10	1708036			1206604			2615629			2204791	
SG-18-43p, 55	1057	1000	300000	0.0003	0.0003	750000	0.006	0.006	225000	2.002	2.002	300000	0.007
SG-18-43p, 55	1112	2000	600000	0.0003		195729	0.007		225000	2.0008		600000	0.007

Analysed by John Torgerson

Checked by

RF response factor
 I interference with adjacent peaks
 NA not analysed
 F estimated peak area

Notations:



TRACER RESEARCH CORPORATION

Job RADIAN (SACRAMENTO, CA)

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7.29

standard conc.		BENZENE		500		µg/l		µg/l		µg/l		µg/l		µg/l	
		area		area		area		area		area		area		area	
response from		1		2		3		1		2		3		1	
10 ul injection		2		3		area		area		area		area		area	
RFs for this sheet		8.39 X 10 ⁻¹⁶		q/area		µg/l		µg/l		µg/l		µg/l		µg/l	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area
N ₂ blank	603	1000													
N ₂ blank	616	2000													
air sample	704	2000													
system blank	731	2000													
VW-3	804	1000													
VW-3	818	100													
VW-3	831	100													
VW-2	845	100													
VW-2	858	100													
VW-1	913	100													
VW-1	927	200													
VC-3-9	940	500													
VC-3-9	953	250													
VC-3-7	1007	1000													
VC-3-7	1021	2000													
Std	1036	10													
SG-18-13p, 5.5	1057	1000													
SG-18-13p, 5.5	1112	2000													

Analysed by John Tangeman

Checked by

RF response factor
I interference with adjacent peaks
NA not analysed

Notations:

mat peak

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/7/87

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2.70

5.02

5.32

5.9

standard conc.		<u>CH₂Cl₂</u>			<u>CHCl₃</u>			<u>1,2 DCA</u>			<u>TCA</u>		
response from		µg/l			µg/l			µg/l			µg/l		
10 ul injection		area			area			area			area		
		1	2	3	1	2	3	1	2	3	1	2	3
RFs for this sheet		q/area			q/area			q/area			q/area		
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l
SG-19-43L7	11:12	500	225000	40.2	40.06	225000	40.004	40.001	225000	40.2	40.06	225000	40.002
SG-19-43L7	11:35	2000	225000	40.06		225000	40.001		225000	40.06		225000	0.001
SG-20-43R7	12:07	1000	225000	40.1	40.06	225000	40.002	40.001	225000	40.1	40.06	225000	0.003
SG-20-43R7	12:21	2000	225000	40.06		225000	40.001		225000	40.06		225000	0.004
SG-21-43L7	12:39	1000	225000	40.1	40.06	225000	40.002	40.001	225000	40.1	40.06	225000	0.002
SG-21-43L7	12:52	2000	225000	40.06		225000	40.001		225000	40.06		225000	0.002
SG-22-43R4	13:44	1000	225000	40.1	40.06	225000	40.002	40.001	225000	40.1	40.06	225000	0.002
SG-22-43R4	13:58	2000	225000	40.06		225000	40.001		225000	40.06		225000	0.002
STD	14:14	10	392981	-		1029767	-		401763	-		1338495	-
SG-23-43L4	15:17	1000	225000	40.1	40.06	225000	40.002	40.001	225000	40.1	40.06	225000	40.0009
SG-23-43L4	15:30	2000	225000	40.06		225000	40.001		225000	40.06		225000	40.0004
SG-24-12P5	15:43	1000	225000	40.1	40.06	225000	40.002	40.001	225000	40.1	40.06	350800	0.01
SG-24-12P5	15:56	2000	225000	40.06		225000	40.001		225000	40.06		1272911	0.02
SG-25-12P6	16:30	50	225000	40.2	40.06	4303492	8	10	225000	40.2	40.06	225000	40.02
SG-25-12P6	16:43	50	225000	40.2	40.06	6365983	11		225000	40.2	40.06	225000	40.02
SG-26-11P2	17:00	1000	225000	40.1	40.06	225000	40.002	40.001	225000	40.1	40.06	101000	0.003
SG-26-11P2	17:13	2000	225000	40.06		225000	40.001		225000	40.06		170854	0.003
STD	17:27	10	272221	-		916406	-		332232	-		1292978	-
air	18:03	2000	225000	40.06		225000	40.001		225000	40.06		200000	0.003

Analysed by for the laboratory
Checked by _____

Notations: I interference with adjacent peaks
NA not analysed
E estimated peak area



TRACER RESEARCH CORPORATION

Job RADIANT (SACRAMENTO, CA)

Date 12/7/87

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		6.06			7.82			10.16		
		CC14			TCF			EDB		
standard conc.		µg/l			µg/l			µg/l		
response from ul injection	1	area	mean	q/area	area	mean	q/area	area	mean	q/area
	2	area	mean	q/area	area	mean	q/area	area	mean	q/area
	3	area	mean	q/area	area	mean	q/area	area	mean	q/area
RFs for this sheet		area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SL-19-43L-7	11:12	500	11:12	500	50000	0.0004	0.007	50000	0.007	0.01
SL-19-43L-7	11:35	2000	11:35	2000	261058	0.01	0.01	261058	0.01	0.008
SL-20-43P-7	12:07	1000	12:07	1000	211530	0.0006	0.02	211530	0.02	0.008
SL-20-43P-7	12:21	2000	12:21	2000	592050	0.0005	0.02	592050	0.02	0.008
SL-21-43L-7	12:39	1000	12:39	1000	100000	0.0008	0.007	100000	0.007	0.008
SL-21-43L-7	12:52	1000	12:52	1000	220685	0.0008	0.008	220685	0.008	0.008
SL-22-43P-4	13:44	1000	13:44	1000	70000	0.0003	0.002	70000	0.002	0.005
SL-22-43P-4	13:59	2000	13:59	2000	144484	0.0002	0.005	144484	0.005	0.008
STD	14:14	10	14:14	10	1227346	-	-	1227346	-	-
SL-23-43L-4	15:17	1000	15:17	1000	128369	0.0003	0.01	128369	0.01	0.02
SL-23-43L-4	15:30	2000	15:30	2000	570943	0.0001	0.02	570943	0.02	0.008
SL-24-12P-5	15:43	1000	15:43	1000	152479	0.0003	0.01	152479	0.01	0.02
SL-24-12P-5	15:56	2000	15:56	2000	547217	0.0001	0.02	547217	0.02	0.008
SL-25-12P-6	16:30	50	16:30	50	2889593	0.3	43	2889593	43	44
SL-25-12P-6	16:43	50	16:43	50	31103608	0.5	46	31103608	46	44
SL-26-11P-2	17:00	1000	17:00	1000	200000	0.0003	0.02	200000	0.02	0.02
SL-26-11P-2	17:13	2000	17:13	2000	433868	0.0001	0.02	433868	0.02	0.008
STD	17:27	10	17:27	10	1219536	-	-	1219536	-	-
Air Samp	18:05	2000	18:05	2000	105299	0.0006	0.007	105299	0.007	0.008

Notations: I interference with adjacent peaks

NA not analysed

E estimated peak area

Analysed by John Langone

Checked by

Job RADIAN (SACRAMENTO, CA)

Date 2/7/87

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TRACER RESEARCH CORPORATION

		BENZENE																	
standard conc.		µg/l				µg/l				µg/l				µg/l					
response from ul injection		1	2	3	area	area	area	area	area	area	area	area	area	1	2	3	area	area	
		area	area	area	area	area	area	area	area	area	area	area	area	area	area	area	area	area	
		RFs for this sheet		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
		sample	time	amt in	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	mean
	SG-19-43L7	11:34	500	<100000	<0.2	<0.04													
	SG-19-43L7	11:48	2000	<100000	<0.04														
	SG-20-43P7	12:07	1000	<100000	<0.08	<0.04													
	SG-20-43P7	12:21	2000	<100000	<0.04														
	SG-21-43L7	12:38	1000	2304603	2	2													
	SG-21-43L7	12:51	2000	3805330	2	2													
	SG-22-43P4	13:43	1000	<100000	<0.08	<0.04													
	SG-22-43P4	13:57	2000	<100000	<0.04														
	STD	14:13	10	5632719	-														
	SG-23-43L4	15:18	1000	<100000	<0.08	<0.04													
	SG-23-43L4	15:31	2000	<100000	<0.04														
	SG-24-12P5	15:44	1000	500000	0.4	0.4													
	SG-24-12P5	15:57	2000	1000240	0.4	0.4													
	SG-25-12P6	16:31	50	6495981	110	>100													
	SG-25-12P6	16:45	50	6074322	100														
	SG-26-11P2	17:02	1000	<100000	<0.08	<0.04													
	SG-26-11P2	17:15	2000	<100000	<0.04														
	STD	17:29	10	4430307	-														

Analysed by John Tanguay
Checked by _____

Notations: I interference with adjacent peaks
NA not analysed
E estimated peak area



TRACER RESEARCH CORPORATION

Job ADIAN (SACRAMENTO, CA)Date 12/7/87Page 2d

standard conc.		VINYL CHLORIDE										µg/l	
		µg/l		area		µg/l		area		µg/l		area	
response from		1		2		3		1		2		3	
ul injection		area		area		area		area		area		area	
RFs for this sheet		g/area		µg/l		µg/l		µg/l		µg/l		µg/l	
sample		amt		area		µg/l		µg/l		µg/l		µg/l	
time		in		µg/l		µg/l		µg/l		µg/l		µg/l	
11:34		500		<0.3		<0.07		<0.07		<0.07		<0.07	
11:48		2000		<100000		<0.07		<0.07		<0.07		<0.07	
12:07		1000		<100000		<0.1		<0.07		<0.07		<0.07	
12:21		2000		<100000		<0.07		<0.07		<0.07		<0.07	
12:38		1000		<100000		<0.1		<0.07		<0.07		<0.07	
12:51		2000		<100000		<0.07		<0.07		<0.07		<0.07	
13:43		1000		<100000		<0.1		<0.07		<0.07		<0.07	
13:57		2000		<100000		<0.07		<0.07		<0.07		<0.07	
14:27		100		1205559		-		-		-		-	
15:18		1000		<100000		<0.1		<0.07		<0.07		<0.07	
15:30		2000		<100000		<0.07		<0.07		<0.07		<0.07	
15:44		1000		<100000		<0.1		<0.07		<0.07		<0.07	
15:57		2000		<100000		<0.07		<0.07		<0.07		<0.07	
16:31		50		4908575		130		140		140		140	
16:45		50		5293202		140		140		140		140	
17:02		1000		<100000		<0.1		<0.07		<0.07		<0.07	
17:15		2000		<100000		<0.07		<0.07		<0.07		<0.07	
17:51		100		1597834		-		-		-		-	
18:05		2000		<100000		<0.07		<0.07		<0.07		<0.07	
Air		100		1597834		-		-		-		-	

Notations: I interference with adjacent peaks

NA not analysed

F estimated peak area

Analysed by John Ferguson

Checked by

Job RADIAN (SACRAMENTO, CA)

Date 12/7/81

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TRACER RESEARCH CORPORATION

0.41

1.30

1.52

2.72

		CO ₂			O ₂			N ₂			CH ₄		
standard conc.		µg/l			µg/l			µg/l			µg/l		
response from		area			area			area			area		
ul injection		area			area			area			area		
RFs for this sheet		g/area			g/area			g/area			g/area		
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l	mean
SG-19-43L-7	11:32	1000	313096	12000	12000	1508124	200000	899512	1000000	100000	100000	12900	12900
SG-19-43L-7	11:38	1000	309416	12000	12000	141219	190000	9092111	1000000	100000	100000	12900	12900
SG-20-43P-12:09	12:09	1000	88454	3300	3100	1698003	220000	8410700	940000	920000	1000000	12900	12900
SG-20-43P-12:23	12:23	1000	76143	2800	2800	1313997	180000	8800000	890000	100000	1000000	12900	12900
SG-21-43L-12:40	12:40	1000	110000	13700	13700	986882	130000	3395275	380000	500000	1000000	12900	12900
SG-21-43L-12:54	12:54	1000	110000	13700	13700	1605446	210000	5470327	610000	100000	1000000	12900	12900
SG-22-43P-4	13:47	1000	37577	1400	1400	1386923	180000	5733176	640000	740000	1000000	12900	12900
SG-22-43P-4	13:53	1000	34396	1300	1300	1802499	240000	7549370	840000	100000	1000000	12900	12900
STD	15:07	1000	692363	-	-	6192228	-	6474190	-	-	908851	-	-
SG-23-43L-4	15:16	1000	30184	1100	1000	2061786	270000	8685529	970000	980000	1000000	12900	12900
SG-23-43L-4	15:21	1000	27827	1000	1000	1994831	260000	8791317	980000	100000	1000000	12900	12900
SG-24-42P-5	15:54	1000	141702	5300	5100	1664736	230000	8704075	970000	960000	1000000	12900	12900
SG-24-42P-5	15:59	1000	131420	5900	5900	1700480	220000	8513041	950000	100000	1000000	12900	12900
SG-25-42P-6	16:11	1000	603532	23000	23000	142083	32000	8034664	900000	900000	778527	23000	23000
SG-25-42P-6	16:33	1000	614123	23000	23000	346864	46000	8118947	910000	100000	778094	23000	23000
SG-26-42P-2	17:05	1000	282483	11000	11000	144337	19000	838225	940000	940000	538691	16000	16000
SG-26-42P-2	17:01	1000	284592	11000	11000	210521	28000	8291562	930000	100000	538538	16000	16000
STD	17:37	1000	627075	-	-	703893	-	642013	-	-	786799	-	-
AIR	18:04	1000	140000	23700	23700	1178478	150000	1961194	620000	100000	1000000	12900	12900

Analysed by John Langene
Checked by _____

Notations: I interference with adjacent peaks
NA not analysed
F estimated peak area

Page 1

estimated peak area

standard conc.		CH ₂ Cl ₂		CHCl ₃		12-OCA		TCA	
response from ul injection	amt in	area	µg/l	area	µg/l	area	µg/l	area	µg/l
10		1358322	200	1866194	10	1352945	200	1983556	5
		2207220		2703590		2199260		2887970	
		3265129		31316699		3275797		31200000	
		7.22 x 10 ⁻¹⁵		1.04 x 10 ⁻¹⁶		7.25 x 10 ⁻¹⁵		4.88 x 10 ⁻¹⁷	
RFs for this sheet		area	µg/l	area	µg/l	area	µg/l	area	µg/l
sample	time	mean		mean		mean		mean	
N ₂ BIK I	6:15	2000	10.09	25000	10.001	25000	10.09	25000	10.0006
N ₂ BIK II	6:27	2000	10.09	25000	10.001	25000	10.09	25000	10.0006
AIR Sample	6:48	2000	10.09	25000	10.001	25000	10.09	25000	10.0006
VC-3-5	8:11	1000	10.2	25000	10.003	25000	10.2	10174133	0.5
VC-3-5	8:37	1000	10.2	25000	10.003	25000	10.2	6842687	0.3
VC-3-3	9:34	1000	10.2	25000	10.003	25000	10.2	16883069	
VC-3-3	9:48	1000	10.2	25000	10.003	25000	10.2	15157312	

Analysed by David Abranovic

Checked by _____



TRACER RESEARCH CORPORATION

Job Radian Sacramento Ca.

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		6.0				7.06				7.76				10.06			
		CCL4				TCE				EDB				PCE			
standard conc.		2		10		20		40		80		160		320		640	
response from		area		area		area		area		area		area		area		area	
ul injection		1123852.1		1853792		2733361		31250724		42274476		51954673		62268816		71561688	
RFs for this sheet		1.56 x 10 ⁻¹⁷		1.06 x 10 ⁻¹⁶		7.14 x 10 ⁻¹⁷		4.23 x 10 ⁻¹⁷		2.23 x 10 ⁻¹⁷		1.12 x 10 ⁻¹⁷		5.61 x 10 ⁻¹⁸		2.81 x 10 ⁻¹⁸	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	area	µg/l	area	µg/l
N ₂ BIK I	6:15	2000	125000	10.0002		125000	10.0001		125000	10.0001		125000	10.0001	125000	10.0004	125000	10.0004
N ₂ BIK II	6:27	2000	125000	10.0002		125000	10.0001		125000	10.0001		125000	10.0001	125000	10.0004	125000	10.0004
ATR Samp	6:47	2000	125000	10.0002		125000	10.0001		125000	10.0001		125000	10.0001	125000	10.0004	125000	10.0004
VC-3-5	8:10	1000	125000	10.0004	10.0004	711430	0.08	0.09	711430	0.08	0.09	711430	0.08	711430	0.08	711430	0.08
VC-3-5	8:36	1000	125000	10.0004	10.0004	974408	0.1	0.1	974408	0.1	0.1	974408	0.1	974408	0.1	974408	0.1
VC-3-3	9:34	1000	125000	10.0004	10.0004	891202	0.07	0.07	891202	0.07	0.07	891202	0.07	891202	0.07	891202	0.07
VC-3-3	9:48	1000	125000	10.0004	10.0004	852037	0.06	0.06	852037	0.06	0.06	852037	0.06	852037	0.06	852037	0.06

Analysed by David Abramovic

Notations: RF response factor
1 interference with adjacent peaks
NA not analysed
R estimated peak area

Checked by

[illegible]

Notations:

RF response factor

interfere with adjacent peaks
not analysed
estimated peak area

Analysed by David Abranovic

Checked by _____



TRACER RESEARCH CORPORATION

Job Radian Sacramento Co.Date 12/08/87Page 1d

0.4

1.17

1.49

2.68

		<u>Co₂</u>		<u>O₂</u>		<u>N₂</u>		<u>C₄H₄</u>	
standard conc.	response from ul injection	1000		1000		1000		1000	
		area	µg/l	area	µg/l	area	µg/l	area	µg/l
		26400	89600	1667940	26094245	15999030	28800	1838912	area
		1624359	2680924	3674003	1.22 x 10 ⁻¹⁰	36079034	3851723	3851723	area
		2634206	1.33 x 10 ⁻¹⁰	1.33 x 10 ⁻¹⁰	1.33 x 10 ⁻¹⁰	1.33 x 10 ⁻¹⁰	1.33 x 10 ⁻¹⁰	1.33 x 10 ⁻¹⁰	area
		3627156	4.20 x 10 ⁻¹¹	4.20 x 10 ⁻¹¹	4.20 x 10 ⁻¹¹	4.20 x 10 ⁻¹¹	4.20 x 10 ⁻¹¹	4.20 x 10 ⁻¹¹	area
RFs for this sheet		area	µg/l	mean	µg/l	area	µg/l	mean	µg/l
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	µg/l
H ₂ BIK I	09:07	1000	<100000	<4200		<100000	<12000		<3400
H ₂ BIK II	09:15	1000	<100000	<4200		<100000	<12000		<3400
ATR Sump	09:10	1000	<100000	<4200		6899004	8410000		<3400
VC-3-5	08:12	1000	276452	12000	180000	7551877	920000	920000	<3400
VC-3-5	08:19	1000	231904	9700	180000	7534551	920000		<3400
VC-3-3	08:06	1000	253308	11000	160000	6889093	910000	920000	<3600
VC-3-3	08:10	1000	263487	11000	160000	6935800	920000		<3600
Notes: { The sample was run using calibration } { run 12/09/87 to see chromatograms from that day }									

Analysed by David Abranakis

Checked by

[illegible]

RF	response factor	
I	interference with adjacent peaks	
NA	not analysed	
S	estimated peak area	
Notations:		
	Analysed by <u>David Abranczik</u>	
	Checked by _____	



TRACER RESEARCH CORPORATION

Job Radon Sacramento Co

Date 12/09/87

Page 1a

		2.65		4.98		5.28		5.86	
		CH ₂ CR ₂		CH ₂ CR ₃		1-2 DCA		TCA	
standard conc.	time	area	µg/l	area	µg/l	area	µg/l	area	µg/l
		µg/l	area	µg/l	area	µg/l	area	µg/l	area
response from ul injection 10	200	1283310	10.08	1722154	10.08	1331144	10.08	1857534	10.08
	200	2325164	10.08	2752299	10.08	2310047	10.08	2853348	10.08
	200	3324349	10.08	3727899	10.08	3278768	10.08	3956145	10.08
	200	6.43 x 10 ⁻¹⁵	10.08	1.36 x 10 ⁻¹⁶	10.08	6.52 x 10 ⁻¹⁵	10.08	5.62 x 10 ⁻¹⁷	10.08
RFs for this sheet		area	µg/l	area	µg/l	area	µg/l	area	µg/l
sample	time	area	µg/l	area	µg/l	area	µg/l	area	µg/l
N ₂ BIK I	06:17	2000	10.08	25000	10.08	25000	10.08	25000	10.08
N ₂ BIK II	06:30	2000	10.08	25000	10.08	25000	10.08	25000	10.08
AIR _{Sample}	07:50	2000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-3-1	08:22	1000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-3-1	08:37	1000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-4-1	08:52	1000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-4-1	09:05	1000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-4-2	09:19	1000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-4-2	09:31	2000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-4-4	09:48	1000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-4-4	10:00	2000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-2-3	10:15	1000	10.08	25000	10.08	25000	10.08	25000	10.08
VC-2-3	10:27	2000	10.08	25000	10.08	25000	10.08	25000	10.08
STD	10:52	10	10.08	838465	10.08	34817	10.08	1035849	10.08
Syst BIK	11:46	2000	10.08	25000	10.08	25000	10.08	25000	10.08
AIR _{Sample}	11:36	2000	10.08	25000	10.08	25000	10.08	25000	10.08
SU-27-61-7	11:59	1000	10.08	25000	10.08	25000	10.08	25000	10.08
SU-27-61-7	12:11	2000	10.08	25000	10.08	25000	10.08	25000	10.08

RF response factor

Notations: I interference with adjacent peaks
NA not analysed
E estimated

Analysed by David Abramovic

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Job Radon Sacramento Co

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Date 12/09/87

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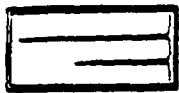
		6.02		7.08		7.28		PCE	
		CCL4		TCE		EDB		PCE	
		2	µg/l	10	µg/l	20	µg/l	5	µg/l
standard conc.									
response from		11255548	area	1863905	area	11929891	area	11423044	area
ul injection		21041855	area	2801478	area	21913145	area	21326898	area
		31131632	area	3857066	area	31951782	area	31421486	area
RFs for this sheet		1.75 x 10 ⁻¹⁷	g/area	1.19 x 10 ⁻¹⁶	g/area	1.04 x 10 ⁻¹⁶	g/area	3.60 x 10 ⁻¹⁷	g/area
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l
									mean
N ₂ BLK I	06:17	2000	225000	0.0002		225000	0.001	225000	0.0004
N ₂ BLK II	06:30	2000	225000	0.0002		225000	0.001	225000	0.0004
Qin Samp	07:50	2000	225000	0.0002		225000	0.001	225000	0.0004
VC-3-1	08:22	1000	225000	0.0004	0.05	412443	0.003	225000	0.0009
VC-3-1	08:37	1000	225000	0.0004	0.07	547564	0.003	225000	0.0009
VC-4-1	08:52	1000	225000	0.0004	0.003	225000	0.003	225000	0.0009
VC-4-1	09:05	1000	225000	0.0004	0.003	225000	0.003	225000	0.0009
VC-4-2	09:19	1000	225000	0.0004	0.003	225000	0.003	225000	0.0009
VC-4-2	09:31	2000	225000	0.0002	0.001	225000	0.001	225000	0.0004
VC-4-4	09:48	1000	225000	0.0004	0.001	225000	0.003	225000	0.0009
VC-4-4	10:00	2000	225000	0.0002	0.001	225000	0.001	225000	0.0004
VC-2-3	10:15	1000	225000	0.0004	0.08	531926	0.003	225000	0.0009
VC-2-3	10:27	2000	225000	0.0002	0.1	1637375	0.001	225000	0.0004
STD	10:52	10	1224968	-	-	952764	-	1863759	-
Sys+BK	11:46	2000	225000	0.0002	0.006	510000	0.001	225000	0.0004
AIR Samp	11:36	2000	225000	0.0002	0.008	141669	0.001	225000	0.0004
SL-27-69L-7	11:59	1000	225000	0.0004	0.02	189962	0.003	225000	0.0009
SL-27-69L-7	12:11		225000	0.0002	0.02	284243	0.001	225000	0.0004

RF response factor

Notations: I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abranovic

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standard conc.		Vinyl Chloride		Benzene		µg/l		µg/l		µg/l	
response from		25		500		area		area		area	
ul injection		12777499		27816448		area		area		area	
VCL-10000		22366669		36000000		area		area		area	
800-10 ul		32736154		7.98 X 10 ⁻¹⁶		area		area		area	
RFs for this sheet		9.52 X 10 ⁻¹⁶		µg/l		mean		µg/l		mean	
sample	time	amt in)	area	µg/l	mean	area	µg/l	area	µg/l	mean	area
N ₂ BIK I	06:17	2000	<100000	<0.05		<100000	<0.04				
N ₂ BIK II	06:30	2000	<100000	<0.05		<100000	<0.04				
Air Sample	07:50	2000	<100000	<0.05		<100000	<0.04				
VC-3-1	08:17	1000	<100000	<0.1	<0.1	<100000	<0.08	<0.08	<0.08	<0.08	
VC-3-1	08:37	1000	<100000	<0.1	<0.1	<100000	<0.08	<0.08	<0.08	<0.08	
VC-4-1	08:52	1000	<100000	<0.1	<0.1	<100000	<0.08	<0.08	<0.08	<0.08	
VC-4-1	09:05	1000	<100000	<0.1	<0.1	<100000	<0.08	<0.08	<0.08	<0.08	
VC-4-2	09:19	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04	<0.08	<0.04	
VC-4-2	09:31	2000	<100000	<0.05		<100000	<0.04				
VC-4-4	09:48	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04	<0.08	<0.04	
VC-4-4	10:00	2000	<100000	<0.05		<100000	<0.04				
VC-2-3	10:15	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04	<0.08	<0.04	
VC-2-3	10:27	2000	<100000	<0.05		<100000	<0.04				
STD	10:39	10	2254148	-		6937559	-				
Syst BIK	11:11	2000	<100000	<0.05		<100000	<0.04				
AIR Sample	11:24	2000	<100000	<0.05		<100000	<0.04				
SG-27-6L-7	11:59	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04	<0.08	<0.04	
SG-27-6L-7	12:11	2000	<100000	<0.05		<100000	<0.04				

Notations:

RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak areaAnalysed by David Abramovic

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Job Asadian Sacramento Co

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0.36

1.07

1.35

42

		C O ₂		O ₂		N ₂		C H ₄	
standard conc.		µg/l	area	µg/l	area	µg/l	area	µg/l	area
response from		1600000	1656985	89600	1656985	739200	15606586	28800	1780676
ul injection /1000		2603055	2652993	2652993	2652993	25558002	25558002	2786042	2786042
		3625402	3610643	3610643	3610643	35573336	35573336	3828072	3828072
RFs for this sheet		4.33 x 10 ⁻¹¹		1.40 x 10 ⁻¹⁰		1.32 x 10 ⁻¹⁰		3.61 x 10 ⁻¹¹	
sample	time	amt [n]	area	µg/l	mean	area	µg/l	area	µg/l
H ₂ BIK I	07:39	1000	<100000	<4300		<100000	<13000	<100000	<3600
H ₂ BIK II	07:45	1000	<100000	<4300		<100000	<13000	<100000	<3600
AIR BIK	08:01	1000	<100000	<4300		6674037	880000	<100000	<3600
VC-3-1	08:33	1000	471675	20000	19000	7204580	950000	<100000	<3600
VC-3-1	08:45	1000	421427	18000		7002021	930000	<100000	<3600
VC-4-1	09:01	1000	167093	7200	7000	6786293	900000	<100000	<3600
VC-4-1	09:14	1000	157607	6800		6644940	880000	<100000	<3600
VC-4-2	09:27	1000	196792	8500	8200	6994505	930000	<100000	<3600
VC-4-2	09:39	1000	181428	7900		6716966	890000	<100000	<3600
VC-4-4	09:56	1000	66757	2900	2800	6933879	910000	<100000	<3600
VC-4-4	10:12	1000	61978	2700		6677712	880000	<100000	<3600
VC-2-3	10:24	1000	244912	11000	10000	6905778	910000	<100000	<3600
VC-2-3	10:35	1000	214599	9300		6557948	870000	<100000	<3600
STD	11:08	1000	601354	-	-	5606410	-	801199	-
SYST BIK	11:12	1000	<100000	<4300		6787545	900000	<100000	<3600
In Sample	11:32	1000	<100000	<4300		6461199	860000	<100000	<3600
SG-27-61-7	12:09	1000	<100000	<4300	<4300	7027948	930000	<100000	<3600
SG-27-61-7	12:20	1000	<100000	<4300		7162419	950000	<100000	<3600

RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Notations:

Analysed by David Abranovic

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Job Radon Sacramento Co

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standard conc.		CH ₂ Cl ₂		CHCl ₃		12-DCA		TCA					
response from		200		10		200		5					
ul injection		1		2		1		1					
10		2		3		2		2					
		3				3		3					
RFs for this sheet		6.43 x 10 ⁻¹⁵		1.36 x 10 ⁻¹⁶		6.52 x 10 ⁻¹⁵		5.62 x 10 ⁻¹⁷					
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l	mean
56-28-69P-5	12:25	1000	125000	10.2	10.08	125000	10.003	125000	10.2	10.08	199825	0.01	0.01
56-28-69P-5	12:40	2000	125000	10.08		125000	10.001	125000	10.08		475160	0.01	
56-28-69L-8	13:40	1000	125000	10.2	10.2	125000	10.003	125000	10.2	10.2	141566	0.008	0.007
56-28-69L-8	13:52	1000	125000	10.2		125000	10.003	125000	10.2		100000	0.006	
56-30-69L-8	14:12	1000	125000	10.2	10.08	125000	10.003	125000	10.2	10.08	191572	0.01	0.01
56-30-69L-8	14:31	2000	125000	10.08		125000	10.001	125000	10.08		430000	0.01	
56-30-69L-8	14:48	1000	125000	10.2	10.08	125000	10.003	125000	10.2	10.08	249986	0.01	0.02
56-30-69L-8	15:01	2000	125000	10.08		125000	10.001	125000	10.08		747720	0.02	
STD	15:20	10	266460	-		681731	-	265413			811294	-	
56-31-69L-8	15:50	1000	125000	10.2	10.08	125000	10.003	125000	10.2	10.08	100000	0.006	0.006
56-31-69L-8	16:02	2000	125000	10.08		125000	10.001	125000	10.08		226016	0.007	
56-32-69L-8	16:19	1000	125000	10.2	10.08	125000	10.003	125000	10.2	10.08	120148	0.007	0.006
56-32-69L-8	16:32	2000	125000	10.08		125000	10.001	125000	10.08		157929	0.004	
STD	16:48	10	220256	-		603883	-	240794	-		750699	-	
AIR Sample	17:19	2000	125000	10.08		125000	10.001	125000	10.08		125000	10.001	

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abranovic

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Job Radon Sacramento Ca

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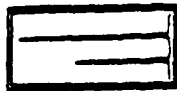
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standard conc.		CCL4			TCE			EOB			PCE		
response from		2			10			20			5		
ul injection		10			1			2			1		
RFs for this sheet		1.75 x 10 ⁻¹⁷			1.19 x 10 ⁻¹⁶			1.04 x 10 ⁻¹⁶			3.60 x 10 ⁻¹⁷		
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l	mean
56-28-69P-5	12:25	1000	125000	10.0004	10.0002	250900	0.03	10.04	10.003	10.001	125000	10.0009	10.0001
56-28-69P-5	12:40	2000	125000	10.0002		659886	0.04		10.001		125000	10.0004	
56-29-69L-8	13:40	1000	125000	10.0004	10.0004	354244	0.04	0.04	10.003	10.003	125000	10.0009	10.0009
56-29-69L-8	13:52	1000	125000	10.0004		362750	0.04		10.003		125000	10.0009	
56-30-69L-8	14:12	1000	125000	10.0004	10.0002	1354527	0.2	0.2	10.003	10.001	180000	0.037	0.03
56-30-69L-8	14:31	2000	125000	10.0002		2907191	0.2		10.001		1859364	0.03	
56-30-69L-8	14:48	1000	125000	10.0004	10.0002	1124335	0.1	0.1	10.003	10.001	647503	0.02	0.02
56-30-69L-8	15:01	2000	125000	10.0002		2268123	0.1		10.001		1217198	0.02	
STD	15:20	10	1004197	-		837752	-		-		1370555	-	
56-31-69L-8	15:50	1000	125000	10.0004	10.0002	249907	0.03	0.03	10.003	10.001	110000	10.0009	10.0001
56-31-69L-8	16:02	2000	125000	10.0002		447208	0.03		10.001		110000	10.0004	
56-32-69L-8	16:19	1000	125000	10.0004	10.0002	186662	0.02	0.02	10.003	10.001	110000	10.0009	10.0001
56-32-69L-8	16:32	2000	125000	10.0002		425577	0.03		10.001		110000	10.0009	
STD	16:48	10	919130	-		207079	-		-		1225534	-	
AIR Samp	17:19	2000	125000	10.0002		50000	0.004		10.001		125000	10.0004	

Notations: RF I response factor
 NA interference with adjacent peaks
 E not analysed
 estimated peak area

Analysed by David Abranovic
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standard conc.		Vinyl chloride		Benzene		$\mu\text{g/l}$		$\mu\text{g/l}$		$\mu\text{g/l}$	
response from		25		500		1		area		1	
ul injection		1		2		2		area		2	
		3		3		3		area		3	
RFs for this sheet		9.52×10^{-16}		7.98×10^{-16}		q/area		q/area		q/area	
sample	time	amt in.]	area	$\mu\text{g/l}$	mean	area	$\mu\text{g/l}$	mean	area	$\mu\text{g/l}$	mean
SG-28-69-5	12:25	1000	110000	10.1	10.05	110000	10.08	10.04	110000	10.04	
SG-28-69-5	12:40	2000	110000	10.05		110000	10.04		110000		
SG-28-69-8	13:40	1000	9122440	0.9	0.9	5922407	5	4	5922407	4	
SG-28-69-8	13:52	1000	9127211	0.9		5000000	4		5000000		
SG-30-69-8	14:12	1000	110000	10.1	10.05	110000	10.08	10.04	110000	10.04	
SG-30-69-8	14:31	2000	110000	10.05		110000	10.04		110000		
SG-30-69-8	14:48	1000	110000	10.1	10.05	110000	10.08	10.04	110000	10.04	
SG-30-69-8	15:01	2000	110000	10.05		110000	10.04		110000		
STD	15:32	10	2645521	-		1000000	-		1000000		
SG-31-69-8	15:50	1000	110000	10.1		110000	10.08	10.04	110000	10.04	
SG-31-69-8	16:02	2000	110000	10.05		110000	10.04		110000		
SG-31-69-8	16:19	1000	110000	10.1	10.05	110000	10.08	10.04	110000	10.04	
SG-31-69-8	16:32	2000	110000	10.05		110000	10.04		110000		
STD	17:15	10	2513247	-		1000000	-		1000000		
AIR Sample	17:18	2000	110000	10.05		110000	10.04		110000		

Analysed by David AbramoNotations: RF I response factor
interference with adjacent peaks
NA not analysed
E estimated area

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Job Radian Sacramento Co

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		CO ₂			O ₂			N ₂			C H ₄		
standard conc.		µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area
response from													
ul injection													
RFs for this sheet		4.33 x 10 ⁻¹¹			1.40 x 10 ⁻¹⁰			1.32 x 10 ⁻¹⁰			3.61 x 10 ⁻¹¹		
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l	mean	area	µg/l	mean
56-28-69P-8	12:33	1000	122841	5300	4900	1233569	170000	7434158	980000	980000	1100000	13600	13600
56-28-69P-8	12:36	1000	105015	4500		1388403	190000	7324618	970000		1100000	13600	
56-28-69P-8	14:01	1000	481890	21000	21000	543181	76000	2393133	980000	960000	1100000	13600	13600
56-28-69P-8	14:04	1000	487368	21000		503981	71000	7240470	410000		1100000	13600	
56-28-69P-8	14:40	1000	239262	10000	10000	1314482	180000	6550171	870000	860000	1100000	13600	13600
56-28-69P-8	14:44	1000	255183	11000		1307238	180000	6438172	850000		1100000	13600	
56-28-69P-8	14:57	1000	152330	6600	7200	1476197	210000	6489679	860000	860000	1100000	13600	13600
56-28-69P-8	15:13	1000	182035	7900		1410842	200000	6578681	870000		1100000	13600	
STD	15:44	1000	642615	-		177054	-	6028752	-		881578	-	
56-31-69L-8	15:59	1000	367903	16000	17000	813225	110000	7297621	970000	980000	1100000	13600	13600
56-31-69L-8	16:14	1000	408240	18000		641717	90000	7406215	980000		1100000	13600	
56-32-69L-8	16:29	1000	77967	3400	3300	1698438	240000	6891501	710000	920000	1100000	13600	13600
56-32-69L-8	16:41	1000	73445	3200		1643905	230000	6973115	920000		1100000	13600	
STD	17:28	1000	62532	-		725318	-	6014818	-		898345	-	
AIR	17:31	1000	33088			1793604		6613045			1100000	13600	

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abramo
Checked by _____

Job Radiation Sacramento Co

TRACER RESEARCH CORPORATION

Date 12/10/87

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2.68

4.99

5.29

5.86

standard conc.		CH ₂ Cl ₂		CH ₂ Cl ₃		1,2-DCA		TCA			
response from ul injection		200		10		200		5			
10		1 164051		1 546656		1 150000		1 519363			
		2 149086		2 352509		2 121296		2 574034			
		3 165320		3 506077		3 202902		3 665506			
RFs for this sheet		1.25 x 10 ⁻¹⁴		2.13 x 10 ⁻¹⁶		1.27 x 10 ⁻¹⁴		8.53 x 10 ⁻¹⁷			
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
Na BIK I	06:13	2000	225000	0.2		225000	0.003		225000	0.001	
Na BIK II	06:25	2000	225000	0.2		225000	0.003		225000	0.001	
ATR Sample	06:38	2000	225000	0.2		225000	0.003		225000	0.001	
SYST BIK	07:38	2000	110000	0.06		110000	0.001		110000	0.0008	
54-33-271-3	08:08	2000	110000	0.06	0.06	110000	0.001	0.001	365278	0.02	0.02
54-33-271-3	08:08	2000	110000	0.06		110000	0.001		224365	0.01	
54-34-271-7	08:35	1000	110000	0.1	0.06	110000	0.002	0.001	318264	0.03	0.02
54-34-271-7	08:48	2000	110000	0.06		110000	0.001		525446	0.02	
54-35-271-8	09:00	1000	110000	0.1	0.06	110000	0.002	0.001	179528	0.02	0.02
54-35-271-8	09:13	2000	110000	0.06		110000	0.001		381588	0.02	
54-36-271-7	09:36	1000	110000	0.1	0.1	110000	0.002	0.002	91472	0.008	0.009
54-36-271-7	09:48	1000	110000	0.1		110000	0.002		135446	0.01	
54-37-271-5	10:03	1000	110000	0.1	0.06	110000	0.002	0.001	660721	0.06	0.04
54-37-271-5	10:16	2000	110000	0.06		110000	0.001		825390	0.02	
STD	10:29	10	224327	-		234844	-		934625	-	
54-38-271-8	10:45	1000	110000	0.1	0.1	110000	0.002	0.002	110000	0.0009	0.0009
54-38-271-8	11:13	100	110000	0.1		110000	0.02		110000	0.009	

Analysed by David Abranovic

Checked by

Notations: RF response factor
I interference with adjacent peaks
NA not analysed

NOTE: Detection limits were lowered by lowering

Job Radion Sacramento Co

TRACER RESEARCH CORPORATION

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Page 1b

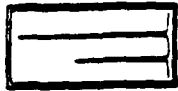
		6.02				2.08				2.78				10.1			
		CCL4				TCE				EDB				PCE			
standard conc.		2				10				20				5			
response from		1656269				1493084				11037719				1841452			
ul injection		2740590				2614746				21245456				2932298			
		3829861				3705863				31313998				3931457			
RFs for this sheet		2.69 X 10 ⁻¹⁷				1.65 X 10 ⁻¹⁶				1.67 X 10 ⁻¹⁶				5.54 X 10 ⁻¹⁷			
sample	time	amt in j	area	µg/l	mean	area	µg/l	mean	µg/l	area	µg/l	mean	µg/l	area	µg/l	area	mean
N ₂ BLK I	06:13	2000	125000	10.0003		125000	10.002			125000	10.002			125000	10.007		
N ₂ BLK II	06:25	2000	125000	10.0003		125000	10.002			125000	10.002			125000	10.007		
AFR Sample	06:38	2000	125000	10.0003		100000	0.008			125000	10.002			125000	10.007		
Syst BLK	07:38	2000	20000	0.0003		136769	0.01			10000	10.008			20000	0.0006		
S ₆ -33-69P-3	08:08	2000	110000	10.0001	10.0001	501495	0.04	0.03		110000	10.008	10.0008		110000	10.0003	10.0003	10.000
S ₆ -33-69P-3	08:22	2000	110000	10.0001		297567	0.02			110000	10.008			110000	10.0003		
S ₆ -34-22L-7	08:35	1000	110000	10.0003	10.0001	1177127	0.2	0.2		110000	10.002	10.0008		18506	0.04	0.04	0.04
S ₆ -34-22L-7	08:48	2000	110000	10.0001		785011	0.1			110000	10.008			1086671	0.03		
S ₆ -35-22L-8	09:00	1000	110000	10.0003	10.0001	449341	0.07	0.06		110000	10.002	10.0008		3621726	0.2	0.2	0.2
S ₆ -35-22L-8	09:13	2000	110000	10.0001		688663	0.06			110000	10.008			7622990	0.2		
S ₆ -36-22L-7	09:36	1000	110000	10.0003	10.0003	1457337	0.02	0.02		110000	10.002	10.002		550000	0.02	0.02	0.02
S ₆ -36-22L-7	09:48	1000	110000	10.0003		195431	0.03			110000	10.002			350719	0.02		
S ₆ -37-22P-5	10:03	1000	110000	10.0003	10.0001	13519320	2	2		110000	10.002	10.0008		722113	0.04	0.04	0.04
S ₆ -37-22P-5	10:16	2000	110000	10.0001		20493929	2			110000	10.0008			1025181	0.03		
STD	10:29	10	1250017	-		967430	-			1752160	-			2012272	-		
S ₆ -38-22L-8	10:45	1000	110000	10.0003	10.0003	8854906	2	2		110000	10.002	10.002		304766	0.02	0.02	0.02
S ₆ -38-22L-8	11:13	100	110000	10.0003		631692	1			110000	10.02			110000	10.006		

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Notations: RF I response factor
NA interference with adjacent peaks
E not analysed
estimated peak area

NOTE: Detection limits were lowered by lowering



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standard conc.		Vinyl Chloride				Benzene				µg/l			
response from		2.5				500				area			
ul injection		13759292				116948147				area			
Benzene 104%		23823971				216919266				area			
Vinyl 100		33382329				315000000				area			
RFs for this sheet		6.84 x 10 ⁻¹⁶				3.07 x 10 ⁻¹⁶				q/area			
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	q/area	area	µg/l	mean	q/area
N ₂ BIK I	06:13	2000	<100000	<0.03		<100000	<0.02						
N ₂ BIK II	06:25	2000	<100000	<0.03		<100000	<0.02						
AIR Samp	06:38	2000	<100000	<0.03		<100000	<0.02						
SYST BIK	07:39	2000	<100000	<0.03		<100000	<0.02						
SG-33-22L-3	08:09	2000	<100000	<0.03	<0.03	<100000	<0.02	<0.02					
SG-33-22L-3	08:23	2000	<100000	<0.03		<100000	<0.02						
SG-34-22L-7	08:37	1000	<100000	<0.03	<0.03	<100000	<0.03	<0.02					
SG-34-22L-7	08:49	2000	<100000	<0.03		<100000	<0.02						
SG-35-22L-8	09:01	1000	<100000	<0.03	<0.03	<100000	<0.03	<0.02					
SG-35-22L-8	09:14	2000	<100000	<0.03		<100000	<0.02						
SG-36-22L-7	09:37	1000	<100000	<0.07	<0.07	<100000	<0.03	<0.03					
SG-36-22L-7	09:49	1000	<100000	<0.07		<100000	<0.03						
SG-37-22P-5	10:02	1000	<100000	<0.07	<0.03	<100000	<0.03	<0.02					
SG-37-22P-5	10:17	2000	<100000	<0.03		<100000	<0.02						
STD	10:30	100	3073786	-		15000000	-						
SG-38-22L-8	10:46	1000	14493134	10	10	I							
SG-38-22L-8	11:14	100	1563078	11		I							

Notations: RF
I interference with adjacent peaks
NA not analysed
E estimated arearesponse factor
interference with adjacent peaks
not analysed
estimated areaAnalysed by David Abramovic

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0.36

1.06

1.34

2.41

		CO ₂			O ₂			N ₂			CH ₄		
standard conc.		area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
response from		area	µg/l		area	µg/l		area	µg/l		area	µg/l	
ul injection		area	µg/l		area	µg/l		area	µg/l		area	µg/l	
1000		area	µg/l		area	µg/l		area	µg/l		area	µg/l	
RFs for this sheet		3.93 x 10 ⁻¹¹			1.06 x 10 ⁻¹⁰			1.25 x 10 ⁻¹⁰			3.16 x 10 ⁻¹¹		
sample	time	amt in l	area	µg/l	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N BIK I	06:22	1000	<100000	<3900	<100000	<11000		<100000	<13000		<100000	<3200	
H ₂ BIK II	06:34	1000	<100000	<3900	<100000	<11000		<100000	<13000		<100000	<3200	
AIR Sample	07:39	1000	<100000	<3900	2138111	230000		6883552	860000		<100000	<3200	
SYST BIK	07:48	1000	<100000	<3900	2043544	220000		6746888	850000		<100000	<3200	
56-33-69P3	08:20	1000	52129	2000	1962303	210000	210000	6990240	870000	880000	<100000	<3200	<3200
56-33-69P3	08:31	1000	46299	1800	1970119	210000		7026694	880000		<100000	<3200	
56-34-22L7	08:46	1000	534743	21000	791754	84000	92000	7446969	890000	890000	<100000	<3200	<3200
56-34-22L7	08:57	1000	434251	17000	983047	100000		7146340	890000		<100000	<3200	
56-35-22L8	09:10	1000	427587	17000	875989	93000	96000	7213760	900000	900000	<100000	<3200	<3200
56-35-22L8	09:23	1000	394971	15000	999168	100000		7177460	900000		<100000	<3200	
56-36-22L8	09:38	1000	79422	3100	820022	87000	889000	7634001	950000	950000	<100000	<3200	<3200
56-36-22L7	10:01	1000	80434	3200	863808	91000		7582450	950000		<100000	<3200	
56-37-22P5	10:13	1000	26960	1100	1788797	190000	190000	5993480	750000	760000	<100000	<3200	<3200
56-37-22P5	10:25	1000	21285	840	1831777	190000		6052411	760000		<100000	<3200	
STD	10:38	1000	632064	-	923874	-		5897702	-		854004	-	
56-38-22L8	10:55	1000	80759	3200	411663	94000	58000	7752221	990000	960000	<100000	<3200	<3200
56-38-22L8	11:22	1000	70681	2800	681370	72000		7535237	940000		<100000	<3200	

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abramovic

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standard conc. response from ul injection 10	CH ₂ Cl ₂				CHCl ₃				1,2-DCA				TCA			
	200		µg/l		10		µg/l		200		µg/l		5		µg/l	
	1	area	1	area	2	area	2	area	3	area	3	area	1	area	2	area
	2	area	3	area	3	area	3	area	3	area	3	area	3	area	3	area
RFs for this sheet																
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l
SG-39-8P-4	11:29	1000	<10000	<0.1	<0.06	<10000	<0.002	<0.001	<10000	<0.1	<0.06	69409	0.006	0.01		
SG-39-8P-4	11:45	2000	<10000	<0.06		<10000	<0.001		<10000	<0.06		360112	0.02			
SG-40-8I-8	12:02	1000	<10000	<0.1	<0.1	<10000	<0.002	<0.002	<10000	<0.1	<0.1	26149223	2	2		
SG-40-8I-8	12:20	50	<10000	<3		<10000	<0.04		<10000	<3		1225226	2			
SG-41-8I-8	12:48	50	<10000	<3	<3	<10000	<0.04	<0.04	<10000	<3	<3	30353269	52	51		
SG-41-8I-8	13:12	50	<10000	<3		<10000	<0.04		<10000	<3		2932345	50			
SG-42-8P-4	13:44	50	<10000	<3	<1	<10000	<0.04	<0.02	<10000	<3	<1	121418	0.2	0.1		
SG-42-8P-4	14:00	100	<10000	<1		<10000	<0.02		<10000	<1		133809	0.1			
STD	14:38	10	199858	-		639030	-		342772	-		701643	-			
												</				

RF response factor

Notations: I interference with adjacent peaks
NA not analysed
E estimated

Analysed by David Abranovic

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standard conc.		CCL 4				TCE				EDB				PCE			
response from		2		10		20		5		1		2		3		5.54 x 10 ⁻¹⁷	
ul injection		area		area		area		area		area		area		area		area	
RFs for this sheet		2.69 x 10 ⁻¹⁷		1.65 x 10 ⁻¹⁶		1.67 x 10 ⁻¹⁶		1.65 x 10 ⁻¹⁶		1.67 x 10 ⁻¹⁶		1.67 x 10 ⁻¹⁶		1.67 x 10 ⁻¹⁶		1.67 x 10 ⁻¹⁶	
sample	time	amt [n]	area	µg/l	mean	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	mean
SG-39-8P-4	11:29	1000	<10000	<0.0003	<0.0001	316729	0.05	316729	0.04	<10000	<0.002	<10000	<0.002	1388962	0.08	<0.08	
SG-39-8P-4	11:45	2000	<10000	<0.0001		497005	0.04	497005	0.04	<10000	<0.002	<10000	<0.002	2779268	0.08		
SG-40-8I-8	12:02	1000	<10000	<0.0003	<0.0003	11742190	2	11742190	2	<10000	<0.002	<10000	<0.002	70853924	4	7.8	
SG-40-8I-8	12:20	50	<10000	<0.005		374039	1	374039	1	<10000	<0.03	<10000	<0.03	9914611	11		
SG-41-8I-8	12:48	50	<10000	<0.005	<0.005	302806	1	302806	2	<10000	<0.03	<10000	<0.03	43712885	49	46	
SG-41-8I-8	13:12	50	<10000	<0.005		561978	2	561978	2	<10000	<0.03	<10000	<0.03	38085407	42		
SG-41-8P-4	13:44	50	<10000	<0.005	<0.003	20651	0.07	20651	0.1	<10000	<0.03	<10000	<0.02	786238	0.9	1	
SG-41-8P-4	14:00	100	<10000	<0.003		143388	0.2	143388	0.2	<10000	<0.02	<10000	<0.02	1940499	1		
STD	14:38	10	1073270	-		700000		700000		730000		730000		5100000			

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

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Job Radio Shack Sacramento Co

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~~Checked by~~

standard conc.		µg/l			µg/l			µg/l			µg/l		
response from		area			area			area			area		
ul injection		1			2			3			1		
		area			area			area			area		
		2			3			2			3		
		area			area			area			area		
		3			3			3			3		
		area			area			area			area		
		area			area			area			area		
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		area			area			area			area		
		area			area								

Analysed by David Abranovic

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Job Radon Sacramento Co. (Condensed Data)

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standard conc.		µg/l		µg/l		µg/l	
response from		area		area		area	
ul injection		1		2		3	
RFs for this sheet		q/area		q/area		q/area	
sample	time	amt in	area	µg/l	mean	area	µg/l
CH ₂ Cl ₂	40.04	40.0006	40.0007	0.05	0.00007	40.0007	0.00007
VC-2-7	40.04	40.0006	40.0007	8	0.00007	40.0007	0.00007
56-44-81-8	40.1	40.002	40.1	0.05	0.0003	40.0003	0.0003
56-45-81-7	40.04	40.0006	40.0007	0.01	0.00007	40.0007	0.00007
56-46-81-8	41	40.02	41	10	0.003	40.003	0.003
56-47-42-4	40.4	40.006	40.3	1	0.0007	40.0007	0.0007
56-48-41-4	40.04	40.0006	40.0007	0.01	0.00007	40.0007	0.00007
56-49-42-3	40.4	40.006	40.3	0.2	0.0007	40.0007	0.0007
56-50-42-6	40.04	40.0006	40.0007	0.06	0.00007	40.0007	0.00007
56-53-42-3	40.04	40.0006	40.0007	0.002	0.00007	40.0007	0.00007
56-54-38-6	40.04	40.0006	40.0007	0.06	0.00007	40.0007	0.00007
56-55-38-4	40.4	40.006	40.3	0.6	0.005	40.005	0.005
56-56-38-4	40.4	40.006	40.3	0.03	0.00007	40.0007	0.00007
56-57-38-2	40.04	40.0006	40.0007	0.004	0.00007	40.0007	0.00007

Notations: RF 1 response factor
NA interference with adjacent peaks
E not analysed
estimated peak area

Analysed by David Abramovic

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		2.62		4.95		5.25		5.82	
		CH ₂ Cl ₂		CH ₂ Cl ₂		12-DCI		TCA	
standard conc.		area	µg/l	area	µg/l	area	µg/l	area	µg/l
response from		1261220	10	1765925	10	1373704	10	1786241	10
ul injection 10		2328532	10	2844776	10	2330980	10	21054284	10
		3239789	10	3870130	10	3299869	10	3100000	10
RFs for this sheet		7.23 x 10 ⁻¹⁵		1.21 x 10 ⁻¹⁶		5.97 x 10 ⁻¹⁵		5.28 x 10 ⁻¹⁷	
sample	time	amt in	area	µg/l	mean	area	µg/l	area	µg/l
N ₂ BIK I	06:16	2000	110000	10.04		110000	10.03	110000	10.0003
N ₂ BIK II	06:28	2000	110000	10.04		110000	10.03	110000	10.0003
AIR sample	07:12	2000	110000	10.04		110000	10.03	110000	10.0003
Syst BIK	07:25	2000	110000	10.04		110000	10.03	110000	10.0003
SL-43-8P4	07:44	50	110000	10.04	10.04	110000	10.03	110000	10.03
SL-43-8P4	07:59	2000	110000	10.04		110000	10.03	110000	10.03
VC-2-7	08:27	2000	110000	10.04	10.04	110000	10.03	110000	10.03
VC-2-7	08:40	200	110000	10.4		110000	10.03	110000	10.03
SL-44-8P-8	09:02	50	110000	10.1	10.1	110000	10.03	110000	10.03
SL-44-8P-8	09:15	500	110000	10.1		110000	10.03	110000	10.03
SL-45-8P-7	09:32	50	110000	10.4	10.4	110000	10.03	110000	10.03
SL-45-8P-7	09:49	2000	110000	10.04		110000	10.03	110000	10.03
SL-46-8P-8	10:05	50	110000	10.1	10.1	110000	10.03	110000	10.03
SL-46-8P-8	10:19	50	110000	10.1		110000	10.03	110000	10.03
Std	10:35	10	294532	-		311365	-	100000	-
SL-47-4P-4	11:11	200	110000	10.4	10.4	110000	10.03	110000	10.03
SL-47-4P-4	11:25	200	110000	10.4		110000	10.03	110000	10.03

RF response factor

Notations: I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abranovic

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Job Radian Sacramento Co

TRACER RESEARCH CORPORATION

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Page 1b

		5.98		7.05		7.34		10.02	
		CCL 4		TCE		EOB		PCE	
standard conc.		2		10		20		5	
response from		11515012	area	11055186	area	12201302	area	11894839	area
ul injection		21294410	area	2955220	area	22194975	area	21819022	area
10		31375199	area	31043101	area	32251680	area	31948600	area
RFs for this sheet		1.43 x 10 ⁻¹⁷		9.82 x 10 ⁻¹⁷		9.03 x 10 ⁻¹⁷		2.65 x 10 ⁻¹⁷	
sample	time	amt (n)	area	mean	µg/l	area	mean	area	µg/l
N ₂ BIK I	06:16	2000	<10000	<0.00007	<0.0005	<10000	<0.0004	<10000	<0.0001
N ₂ BIK II	06:28	2000	<10000	<0.00007	<0.0005	<10000	<0.0004	<10000	<0.0001
AIR Sump	07:12	2000	1000000	0.0007	0.02	<10000	<0.0004	200000	0.003
Syst. BIK	07:25	2000	1000000	0.0007		<10000	<0.0004	200000	0.003
SG-43-8P-4	07:44	50	<10000	<0.003	0.02	<10000	<0.002	500000	0.3
SG-43-8P-4	07:59	2000	<10000	<0.00007	0.02	<10000	<0.0004	23640377	0.3
VC-2-7	08:27	2000	<10000	<0.00007	2	<10000	<0.0004	271078	0.004
VC-2-7	08:40	200	<10000	<0.0007	13	<10000	<0.004	<10000	<0.001
SG-44-8T-8	09:02	50	<10000	<0.003	0.2	<10000	<0.02	1872914	1
SG-44-8T-8	09:15	500	<10000	<0.0003	802456	<10000	<0.002	6043884	3
SG-45-8T-7	09:32	50	<10000	<0.003	273972	<10000	<0.02	432011	0.006
SG-45-8T-7	09:49	2000	<10000	<0.0007	1076187	<10000	<0.004	41939116	0.6
SG-46-8T-8	10:05	50	<10000	<0.003	2053589	<10000	<0.02	7823190	4
SG-46-8T-8	10:19	50	<10000	<0.003	1911026	<10000	<0.02	8137670	4
STD	10:35	10	1545357	-	1054159	1913361	-	1850304	-
SG-47-9T-4	11:11	200	<10000	<0.0007	2720762	<10000	<0.004	1336866	0.2
SG-47-9T-4	11:25	200	<10000	<0.0007	2660637	<10000	<0.004	1077483	0.1

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abramovic

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Page 1C

1.27

7.24

standard conc.		Vinyl chloride		Benzene		µg/l		µg/l		µg/l	
response from		25		500		area		area		area	
ul injection		area		area		area		area		area	
µg/gal ± 100		area		area		area		area		area	
Bene - 10		area		area		area		area		area	
Rf's for this sheet		1.07 x 10 ⁻¹⁵		3.95 x 10 ⁻¹⁶		g/area		g/area		g/area	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N ₂ BIK I	06:16	2000	<100000	<0.05		<100000	10.02				
N ₂ BIK II	06:28	2000	<100000	<0.05		<100000	<0.02				
ATR Sum A	07:12	2000	<100000	<0.05		<100000	<0.02				
SYST BIK	07:25	2000	<100000	<0.05		<100000	<0.02				
SG-43-8P-4	07:44	50	<100000	<0.05	<0.05	<100000	<0.8	0.7			
SG-43-8P-4	07:59	2000	<100000	<0.05		3627574	0.7				
VC-2-7	08:27	2000	<100000	<0.05	<0.05	<100000	<0.02	<0.02			
VC-2-7	08:40	200	<100000	<0.5		<100000	10.2				
SG-44-8T-8	09:02	50	<100000	<0.2	<0.2	<100000	10.8	<0.08			
SG-44-8T-8	09:15	500	<100000	<0.2		<100000	10.08				
SG-45-8T-7	09:33	50	<100000	<0.2	<0.05	<100000	<0.7	<0.006			
SG-45-8T-7	09:49	2000	<100000	<0.05		27860	0.006				
SG-46-8T-8	10:05	50	14176916	300	>2.00	830123	7	76			
SG-46-8T-8	10:19	50	13242491	105		679623	5				
STD	10:58	10	2170989	-		11031615	-				
SG-47-42L-4	11:11	200	<100000	<0.5	>50.5	<100000	<0.2	<0.2			
SG-47-42L-4	11:25	200	<100000	<0.5		<100000	<0.2				

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RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Job Radiation Sacramento Co.

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0.36

1.04

1.32

2.32

		CO ₂		O ₂		N ₂		CH ₄	
standard conc.		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
response from		area	area	area	area	area	area	area	area
ul injection		area	area	area	area	area	area	area	area
1000		area	area	area	area	area	area	area	area
RFs for this sheet		4.42 x 10 ⁻¹¹		9.75 x 10 ⁻¹¹		1.34 x 10 ⁻¹⁰		3.39 x 10 ⁻¹¹	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area
H ₂ BLK I	06:25	1000	<100000	<4400		<100000	<13000		<100000
H ₂ BLK II	06:47	1000	<100000	<4400		<100000	<1300		<100000
ATR Samp.	06:51	1000	<100000	<4400		6528487	870000		<100000
Syst BLK.	07:35	1000	<100000	<4400		790557	960000		<100000
SG-43-8R-4	08:08	1000	30187	1300	1300	6674371	890000	880000	<100000
SG-43-8R-4	08:11	1000	29871	1300		6543545	880000		<100000
VC-2-7	08:54	1000	<100000	<4400	<4400	6103355	820000	820000	<100000
VC-2-7	08:58	1000	<100000	<4400		6211345	830000		<100000
SG-44-8I-8	09:24	1000	474405	21000	21000	6264686	840000	840000	<100000
SG-44-8I-8	09:28	1000	476093	21000		6332981	850000		<100000
SG-45-8I-7	09:41	1000	75076	3300	3200	7478870	1000000	980000	<100000
SG-45-8I-7	09:46	1000	68253	3100		7150861	960000		<100000
SG-46-8I-8	10:13	1000	621319	27000	27000	6728943	900000	900000	<100000
SG-46-8I-8		1000			lost sample, no second	run!			
STD	10:31	1000	655019			5947373			915318
SG-47-42I-4	11:35	1000	407455	18000	18000	7425584	990000	980000	<100000
SG-47-42I-4	11:39	1000	410035	18000		7198992	960000		<100000

Notations: RF I response factor
NA interference with adjacent peaks
E not analysed
estimated peak area

Analysed by David Abranovic

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2.6

4.91

5.2

5.29

CH ₂ CL ₂		CH ₂ CL ₂		1.2-DC A		TCA	
standard conc.	200	µg/l	area	µg/l	area	µg/l	area
response from	1	area	area	area	area	area	area
ul injection 10	2	area	area	area	area	area	area
	3	area	area	area	area	area	area
RFs for this sheet		7.23x10 ⁻¹⁵		5.97x10 ⁻¹⁵		5.28x10 ⁻¹⁷	
sample	time	amt in	area	µg/l	mean	area	µg/l
S6-48-421-4	11:54	200	<10000	<0.04	<0.0006	<10000	<0.03
S6-48-421-4	12:07	2000	<10000	<0.04	<0.0006	<10000	<0.03
S6-49-421-3	12:28	200	<10000	<0.4	<0.006	<10000	<0.3
S6-49-421-3	12:41	200	<10000	<0.4	<0.006	<10000	<0.3
S6-50-421-6	12:56	200	<10000	<0.4	<0.006	<10000	<0.3
S6-50-421-6	13:10	2000	<10000	<0.04	<0.0006	<10000	<0.03
STD	14:10	10	310657	-	-	339188	-
SYST BIK	14:57	2000	<10000	<0.04	<0.0006	<10000	<0.03
S6-53-381-3	15:14	200	<10000	<0.4	<0.006	<10000	<0.3
S6-53-381-3	15:25	2000	<10000	<0.04	<0.0006	<10000	<0.03
S6-54-381-6	16:00	200	<10000	<0.4	<0.006	<10000	<0.3
S6-54-381-6	16:14	2000	<10000	<0.4	<0.006	<10000	<0.3
S6-55-381-4	16:28	200	<10000	<0.4	<0.006	<10000	<0.3
S6-55-381-4	16:43	200	<10000	<0.4	<0.006	<10000	<0.3
S6-56-381-4	16:56	200	<10000	<0.4	<0.006	<10000	<0.3
S6-56-381-4	17:10	200	<10000	<0.4	<0.006	<10000	<0.3
S6-57-381-2	17:25	200	<10000	<0.4	<0.006	<10000	<0.3
S6-57-381-2	17:39	2000	<10000	<0.04	<0.0006	<10000	<0.03
STD	17:53	10	305326	response factor	-	331533	-

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Notations: I interference with adjacent peaks

NA not analysed

estimated peak area

Job Radiation Sacramento Co

TRACER RESEARCH CORPORATION

Date 12/11/87

Page 2b

standard conc.		SCG		TCE		EDB		PCE	
response from		2		10		20		5	
ul injection 10		1		2		3		1	
RFs for this sheet		1.43 x 10 ⁻¹⁷		9.82 x 10 ⁻¹⁷		9.03 x 10 ⁻¹⁷		2.65 x 10 ⁻¹⁷	
sample	time	area	µg/l	mean	µg/l	area	µg/l	area	µg/l
SG-48-42L-4	11:54	10000	10.0007	10.0007	0.5	10000	10.0004	213362	0.03
SG-48-42L-4	12:07	10000	10.0007	10.0007	0.2	10000	10.0004	833301	0.01
SG-49-42L-3	12:28	10000	10.0007	10.0007	15	10000	10.0004	994093	0.1
SG-49-42L-3	12:41	10000	10.0007	10.0007	14	10000	10.0004	1039744	0.1
SG-50-42L-6	12:56	10000	10.0007	10.0007	0.4	10000	10.0004	161720	0.02
SG-50-42L-6	13:10	10000	10.0007	10.0007	0.1	10000	10.0004	2057588	0.03
STD	14:10	1092465	-	-	-	1899970	-	1387691	-
SG-51-BLK	14:57	15000	-	-	-	10000	-	100000	0.001
SG-53-38L-3	15:14	10000	10.0007	10.0007	0.02	10000	10.0004	300000	0.04
SG-53-38L-3	15:25	10000	10.0007	10.0007	0.03	10000	10.0004	2981526	0.03
SG-54-38L-6	16:00	10000	10.0007	10.0007	0.1	10000	10.0004	16521292	2
SG-54-38L-6	16:14	10000	10.0007	10.0007	0.07	10000	10.0004	OLR	-
SG-55-38L-4	16:28	667994	0.05	0.05	0.6	10000	10.0004	5845656	0.8
SG-55-38L-4	16:43	662881	0.05	0.05	0.8	10000	10.0004	4138109	0.5
SG-56-38L-4	16:56	10000	10.0007	10.0007	0.07	10000	10.0004	3941940	0.5
SG-56-38L-4	17:10	10000	10.0007	10.0007	0.07	10000	10.0004	4737206	0.6
SG-57-38L-2	17:25	10000	0.0007	0.0007	0.02	10000	10.0004	10000	10.001
SG-57-38L-2	17:39	139370	0.001	0.001	0.02	10000	10.0004	10000	10.001
STD	17:53	1742472	-	-	-	1873467	-	2140477	-

Notations: I interference with adjacent peaks
NA not analysed
E estimated peak area

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Date 12/11/87

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1.27

7.24

		Vinyl Chloride				Benzene			
standard conc.		25		500		1		2	
response from		1		2		1		2	
ul injection		2		3		3		3	
wid. 100		area		area		area		area	
Beyco		area		area		area		area	
RFs for this sheet		1.07 x 10 ⁻¹⁵		3.95 x 10 ⁻¹⁶		q/area		q/area	
sample	time	amt [in]	area	µg/l	mean	area	µg/l	mean	q/area
S6-48-42L-4	11:54	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02	
S6-48-42L-4	12:07	2000	<100000	<0.05		<100000	<0.02		
S6-4 42L-3	12:28	200	<100000	<0.5	<0.5	<100000	<0.2	<0.2	
S6-4 42L-3	12:41	200	<100000	<0.5		<100000	<0.2		
S6-50-42L-6	12:56	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02	
S6-50-42L-6	13:13	2000	<100000	<0.05		<100000	<0.02		
STD	14:10	10	2186903	-		4360919	-		
24ST BIK	14:57	2000	<100000	<0.05		<100000	<0.02		
S6-53-38L-3	15:14	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02	
S6-53-38L-3	15:25	2000	<100000	<0.05		<100000	<0.02		
S6-54-38L-6	16:00	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02	
S6-54-38L-6	16:14	2000	<100000	<0.05		<100000	<0.02		
S6-55-38L-4	16:28	200	<100000	<0.5	<0.5	<100000	<0.2	<0.2	
S6-55-38L-4	16:43	2000	<100000	<0.5		<100000	<0.2		
S6-56-38L-4	16:56	200	<100000	<0.5	<0.5	<100000	<0.2	<0.2	
S6-56-38L-4	17:10	2000	<100000	<0.5		<100000	<0.2		
S6-57-38L-2	17:25	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02	
S6-57-38L-2	17:39	2000	<100000	<0.05		<100000	<0.02		
STD	17:53	RF	response factor			3536003	-		

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Notations: I interference with adjacent peaks

NA not analysed

E estimated peak area

Date 12/11/83

Page 2d

0.36

1.04

1.32

2.37

standard conc.		CO ₂		O ₂		N ₂		CH ₄			
response from		µg/l		µg/l		µg/l		µg/l			
ul injection		area		area		area		area			
1000		1		2		3		1			
		2		3		1		2			
		3		1		2		3			
RFs for this sheet		4.42 x 10 ⁻¹¹		9.75 x 10 ⁻¹¹		1.34 x 10 ⁻¹⁰		3.39 x 10 ⁻¹¹			
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
56-48-42-4	12:03	1000	249877	11000	11000	1987534	190000	190000	7528514	1000000	1000000
56-48-42-4	12:16	1000	241915	11000	11000	1980315	190000	190000	7504000	1000000	1000000
56-49-42-3	12:37	1000	138986	6100	6100	2546948	250000	250000	7348493	980000	980000
56-49-42-3			lost sample		no duplicate run						
56-50-42-6	13:05	1000	295091	13000	12000	2251107	220000	220000	7095169	950000	940000
56-50-42-6	13:21	1000	275431	12000	12000	2266924	220000	220000	6931704	930000	930000
STD	14:18	1000	630722	-	-	1333819	-	-	6102427	-	-
56-53-38-3	15:25	1000	1100000	4400	4400	2537478	250000	150000	6598084	880000	880000
56-53-38-3	15:56	1000	410000	4400	4400	522198	51000	880000	6562569	880000	880000
56-54-38-6	16:08	1000	233528	10000	10000	488898	96000	110000	7367453	990000	960000
56-54-38-6	16:23	1000	214024	9000	9000	1269956	120000	930000	6969420	930000	930000
56-55-38-4	16:40	1000	198579	8600	7600	2341271	230000	220000	6932530	930000	900000
56-55-38-4	16:51	1000	152413	6700	6700	2242306	220000	860000	6402663	860000	860000
56-56-38-4	17:05	1000	178508	7900	7700	2212770	220000	940000	7122494	950000	940000
56-56-38-4	17:08	1000	170000	7500	7500	2248659	220000	940000	7005348	940000	940000
56-57-38-2	17:34	1000	410000	4400	4400	2698375	260000	940000	7006250	940000	940000
56-57-38-2	17:37	1000	410000	4400	4400	2762943	270000	930000	6947613	930000	930000
STD		1000									

Notations: RF
I response factor
NA interference with adjacent peaks
E not analysed
estimated peak area

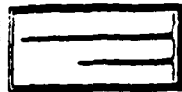
Analysed by David Abranovic

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(Condensed Data)

TRACER RESEARCH CORPORATION



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Page 1

standard conc.		µg/l		µg/l		µg/l	
response from		area		area		area	
ul injection		1		2		3	
1		area		area		area	
2		area		area		area	
3		area		area		area	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area		area		area	
1		1		2		3	
2		2		3		3	
3		3		3		3	
µg/l		µg/l		µg/l		µg/l	
area		area					

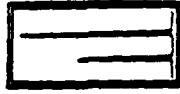
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		2.6		4.9		5.3		5.78	
		CH ₂ Cl ₂		CHCl ₃		1,2-DCA		TCA	
standard conc.	response from ul injection	200	150000	2187374	3207270	200	1250000	2251767	3256790
		area	area	area	area	area	area	area	area
RFs for this sheet	time	amt in	area	µg/l	mean	area	µg/l	mean	area
N ₂ BIK I	07:02	2000	<10000	<0.06		<10000	<0.0009		<10000
N ₂ BIK II	07:15	2000	<10000	<0.06		<10000	<0.0009		<10000
Qlie Samp	07:27	2000	<10000	<0.06		<10000	<0.0009		<10000
Syst BIK	07:40	2000	<10000	<0.06		<10000	<0.0009		<10000
S ₆ -58-24P-2	09:15	2000	<10000	<0.06	<0.06	<10000	<0.0009	<0.0009	<10000
S ₆ -58-24P-2	09:28	2000	<10000	<0.06		<10000	<0.0009		<10000
S ₆ -59-24P-3	09:43	200	<10000	<0.6	<0.06	<10000	<0.0009	<0.0009	<10000
S ₆ -59-24P-3	09:57	2000	<10000	<0.06		<10000	<0.0009		<10000
S ₆ -60-24L-8	10:10	200	<10000	<0.6	<0.06	<10000	<0.0009	<0.0009	<10000
S ₆ -60-24L-8	10:23	2000	<10000	<0.06		<10000	<0.0009		<10000
S ₆ -61-24L-8	10:39	200	<10000	<0.6	<0.06	<10000	<0.0009	<0.0009	<10000
S ₆ -61-24L-8	10:52	2000	<10000	<0.06		<10000	<0.0009		<10000
S ₆ -62-24L-8	11:08	200	<10000	<0.6	<0.06	<10000	<0.0009	<0.0009	<10000
S ₆ -62-24L-8	11:21	2000	<10000	<0.06		<10000	<0.0009		<10000
STD	12:16	10	263476	-		644885	-		253169
S ₆ -63-24L-3	12:56	200	<10000	<0.6	<0.06	<10000	<0.0009	<0.0009	<10000
S ₆ -63-24L-3	13:12	2000	<10000	<0.06		<10000	<0.0009		<10000
RF		response factor		interference with adjacent peaks		not analysed		estimated peak area	
Notations:		I		NA		E			

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5.94

7.0

7.7

7.94

standard conc.		CCL4				TCE				EDB				PCE			
response from		2		µg/l		10		µg/l		20		µg/l		5			
ul injection		175 0000		area		1 622 144		area		1 168 0000		area		1 803 137			
		2787118		area		2 675 329		area		2 170 7940		area		2 843 750			
		3811119		area		369 5900		area		3 171 7296		area		3 937 830			
RFs for this sheet		2.56 x 10 ⁻¹⁷		g/area		1.50 x 10 ⁻¹⁶		g/area		11.8 x 10 ⁻¹⁴		g/area		5.80 x 10 ⁻¹⁷			
sample	time	amt [n]	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean			
N ₂ BIK I	07:02	2000	<10000	<0.0001		<10000	<0.0008		<10000	<0.0006		<10000	<0.0003				
N ₂ BIK II	07:15	2000	<10000	<0.0001		<10000	<0.0008		<10000	<0.0006		<10000	<0.0003				
AIR Samp.	07:22	2000	<10000	0.001		<10000	<0.0008		<10000	<0.0006		<10000	<0.0003				
Syst BIK	07:40	2000	<10000	0.001		<10000	<0.0008		<10000	<0.0006		<10000	<0.0003				
S ₆ -58-24L-2	09:15	2000	<10000	<0.0001	<0.0001	<1570256	0.09	0.08	<10000	<0.0006	<0.0006	379363	0.01	>0.01			
S ₆ -58-24L-2	09:28	2000	<10000	<0.0001		1046409	0.08		<10000	<0.0006		344713	0.01				
S ₆ -59-24L-3	09:43	2000	<10000	<0.0001	<0.0001	172364	0.1	0.08	<10000	<0.0006	<0.0006	<10000	<0.0003	<0.03			
S ₆ -59-24L-3	09:57	2000	100000	0.001		901374	0.07		<10000	<0.0006		100000	0.03				
S ₆ -60-24L-8	10:10	2000	<10000	<0.0001	<0.0001	475574	0.4	0.4	<10000	<0.0006	<0.0006	<10000	<0.0003	<0.0003			
S ₆ -60-24L-8	10:23	2000	<10000	<0.0001		5637229	0.4		<10000	<0.0006		<10000	<0.0003				
S ₆ -61-24L-8	10:39	2000	<10000	<0.0001	<0.0001	<10000	<0.0008	0.04	<10000	<0.0006	<0.0006	<10000	<0.0003	<0.0003			
S ₆ -61-24L-8	10:52	2000	<10000	<0.0001		595445	0.04		<10000	<0.0006		<10000	<0.0003				
S ₆ -62-24L-8	11:08	2000	<10000	<0.0001	<0.0001	472741	0.4	0.2	<10000	<0.0006	<0.0006	520000	0.01	>0.02			
S ₆ -62-24L-8	11:21	2000	<10000	<0.0001		1226412	0.09		<10000	<0.0006		522979	0.02				
STD	12:16	10	805089	-		621438	-		1500828	-		839668	-				
S ₆ -63-24L-3	12:56	2000	<10000	<0.0001	<0.0001	30000	0.02	0.02	<10000	<0.0006	<0.0006	<10000	<0.0003	<0.0003			
S ₆ -63-24L-3	13:12	2000	<10000	<0.0001		287235	0.02		<10000	<0.0006		<10000	<0.0003				

Notations:

RF response factor

I interference with adjacent peaks

NA not analysed

E estimated peak area

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1,2,3 Benzene

standard conc.		Vinyl Chloride		Benzene		µg/l		µg/l		µg/l		µg/l	
response from		25		500		1		1		1		1	
ul injection		12433349		112308805		area		area		area		area	
Benzene 10		22773837		21514637		area		area		area		area	
RFs for this sheet		32955643		312725292		area		area		area		area	
		4.19 x 10 ⁻¹⁶		5.65 x 10 ⁻¹⁶		g/area		g/area		g/area		g/area	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l
N ₂ BLK I	07:03	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03
N ₂ BLK II	07:16	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03
Qin Samp	07:29	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03
Syst BLK	07:41	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03
S ₆ -58-24P-2	07:16	2000	1100000	0.05	10.05	1100000	0.03	10.03	1100000	0.03	10.03	1100000	0.03
S ₆ -58-24P-2	07:29	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03
S ₆ -59-24P-3	09:44	200	1100000	0.05	10.05	1100000	0.03	10.03	1100000	0.03	10.03	1100000	0.03
S ₆ -59-24P-3	09:57	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03
S ₆ -60-24L-8	10:11	200	1100000	0.05	10.05	1100000	0.03	10.03	1100000	0.03	10.03	1100000	0.03
S ₆ -60-24L-8	10:24	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03
S ₆ -61-24L-8	10:40	200	1100000	0.05	10.05	1100000	0.03	10.03	1100000	0.03	10.03	1100000	0.03
S ₆ -61-24L-8	10:53	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03
S ₆ -62-24L-8	11:08	200	1100000	0.05	10.05	1100000	0.03	10.03	1100000	0.03	10.03	1100000	0.03
S ₆ -62-24L-8	11:21	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03
STD	12:15	600	1881511	-		2212377	-		2212377	-		2212377	-
S ₆ -63-24L-8	12:57	200	1100000	0.05	10.05	1100000	0.03	10.03	1100000	0.03	10.03	1100000	0.03
S ₆ -63-24L-8	13:13	2000	1100000	0.05		1100000	0.03		1100000	0.03		1100000	0.03

Notations: RF I response factor
 NA interference with adjacent peaks
 E not analysed
 estimated peak area

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0.34

1.03

1.28

2.3

		CO ₂		O ₂		N ₂		C ₂ H ₄	
standard conc.		µg/l	area	µg/l	area	µg/l	area	µg/l	area
response from ul injection 1000	1574174		1605691		15517409		1793711		1793711
	2561193		2569292		25345958		2809857		2809857
	3560724		3622937		35524420		3800206		3800206
	4.67 x 10 ⁻¹¹	µg/l	area	µg/l	area	µg/l	area	µg/l	area
RFs for this sheet		µg/l	area	µg/l	area	µg/l	area	µg/l	area
sample	amt in	µg/l	area	µg/l	area	µg/l	area	µg/l	area
H ₂ BIK I	07:13	1000	4700	15000	100000	14000	100000	3600	100000
H ₂ BIK II		1000	4700	15000	100000	14000	100000	3600	100000
Qin Sample	07:37	1000	4700	260000	6296409	850000	100000	3600	100000
Syst BIK	07:52	1000	4700	260000	6435546	870000	100000	3600	100000
S ₄ -58-24P-2	09:17	1000	4700	250000	6298298	850000	840000	3600	100000
S ₄ -58-24P-2	09:38	1000	4700	240000	6185146	840000	100000	3600	100000
S ₄ -59-24P-3	09:53	1000	4700	250000	6217671	840000	820000	3600	100000
S ₄ -59-24P-3	10:06	1000	4700	240000	5958621	810000	100000	3600	100000
S ₄ -60-24L-8	10:21	1000	1200	230000	5789928	810000	800000	3600	100000
S ₄ -60-24L-8	10:35	1000	4700	230000	5771410	800000	100000	3600	100000
S ₄ -61-24L-8	10:48	1000	4700	230000	5748783	780000	780000	3600	100000
S ₄ -61-24L-8	11:01	1000	4700	5200	1105495	150000	100000	3600	100000
S ₄ -62-24L-8	11:18	1000	2100	7500	6138119	830000	850000	3600	100000
S ₄ -62-24L-8	11:43	1000	2100	100000	6401564	870000	100000	3600	100000
STD	12:38	1000	-		5325217	-	7988910	-	
S ₄ -63-24L-3	13:08	1000	4700	260000	5972610	810000	820000	3600	100000
S ₄ -63-24L-3	13:25	1000	4700	260000	6038420	820000	100000	3600	100000

RF response factor

Notations: I interference with adjacent peaks

NA not analysed

E estimated peak area

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Checked by

standard conc.	CH ₂ Cl ₂			CH ₂ Cl ₃			12-DCA			TCA		
	area	µg/l	µg/l	area	µg/l	µg/l	area	µg/l	µg/l	area	µg/l	µg/l
response from ul injection 10	1	200		1	10		1	200		1	5	
	2			2			2			2		
	3			3			3			3		
RFs for this sheet												
sample	time	amt in µl	area	µg/l	mean	g/area	area	µg/l	mean	g/area	area	µg/l
VC-1-3	13:43	200	<10000	<0.6	<0.06	<10.009	<10000	<0.4	<0.04	<10.008	<10000	<0.008
VC-1-3	13:55	2000	<10000	<0.06		<10.009	<10000	<0.04		<0.007	194262	0.007
VC-6-3	14:09	200	<10000	<0.6	<0.6	<10.009	<10000	<0.4	<0.4	<10.007	6230301	2
VC-6-3	14:22	200	<10000	<0.6		<10.009	<10000	<0.4			7603777	3
VC-6-2	14:38	200	<10000	<0.6	<0.6	<10.009	<10000	<0.4	<0.4	<10.007	12170933	5
VC-6-2	14:52	200	<10000	<0.6		<10.009	<10000	<0.4			1479032	6
VC-6-1	15:05	200	<10000	<0.6	<0.6	<10.009	<10000	<0.4	<0.4	<10.007	19418518	11
VC-6-1	15:17	200	<10000	<0.6		<10.009	<10000	<0.4			27715355	11
STD	15:45	10	157643	-	-	-	250000	-	-	-	658443	-
Qin Sanya	16:11	2000	<10000	<0.06		<10.009	<10000	<0.04			100000	0.004

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Job Radium Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/14/87

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		5.94		7.0		7.7		9.94	
		CCL 4		TCE		EDB		PCE	
standard conc.		µg/l	area	µg/l	area	µg/l	area	µg/l	area
2			1		1		20		5
1			2		2		2		2
2			3		3		3		3
3									
RFs for this sheet		2.56 x 10 ⁻¹⁷		1.50 x 10 ⁻¹⁶		11.8 x 10 ⁻¹⁶		5.80 x 10 ⁻¹⁷	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area
W-1-3	13:43	200	<10000	<0.001	<0.001	<10000	<0.006	<0.006	<10000
W-1-3	13:55	2000	<10000	<0.001	<0.001	<10000	<0.006	<0.006	<10000
W-6-3	14:09	200	<10000	<0.001	<0.001	<10000	<0.006	<0.006	<10000
W-6-3	14:22	200	<10000	<0.001	<0.001	<10000	<0.006	<0.006	<10000
W-6-2	14:38	200	<10000	<0.001	<0.001	<10000	<0.006	<0.006	<10000
W-6-2	14:52	200	<10000	<0.001	<0.001	<10000	<0.006	<0.006	<10000
W-6-1	15:05	200	<10000	<0.001	<0.001	<10000	<0.006	<0.006	<10000
W-6-1	15:17	200	<10000	<0.001	<0.001	<10000	<0.006	<0.006	<10000
STD	15:45	10	820077	-	-	706159	-	-	767752
Air Samp	16:11	2000	100000	0.001	0.001	<10000	<0.006	<0.006	<10000

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

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[illegible]

Notations: RF I NA E

response factor
interference with
not analysed
estimated peak a

adjacent peaks

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RF	response factor	
I	interference with adjacent peaks	
NA	not analysed	
E	estimated peak area	
Notations:		
Analysed by <u>David Abranovic</u>		
Checked by _____		

(Condensed Data)

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[illegible]

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2.56

4.89

5.19

5.76

standard conc.		CH ₂ CL ₂			C ₄ CL ₃			12-OC ₄ A			TCA			
response from		200			10			200			5			
ul injection		1304229			1768709			1320487			1856698			
10		2302776			2759888			2312800			2866976			
		3275837			3748878			3327980			3809896			
RFs for this sheet		6.8 x 10 ⁻¹⁵			1.32 x 10 ⁻¹⁶			6.24 x 10 ⁻¹⁵			5.92 x 10 ⁻¹⁷			
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N ₂ BIK I	08:49	2000	110000	10.03		110000	10.0007		110000	10.03		110000	10.0003	
N ₂ BIK II	09:03	2000	110000	10.03		110000	10.0007		110000	10.03		110000	10.0003	
AIR _{Samp}	10:31	2000	110000	10.03		110000	10.0007		110000	10.03		110000	0.002	
SVSTBIK	10:45	2000	110000	10.03		110000	10.0007		110000	10.03		110000	0.002	
SV64-12P-6	10:59	50	28761	4	4	111242	0.3	0.2	110000	1	1	344188	0.4	0.4
SV64-12P-6	11:14	50	24716	3		60388	0.2		110000	1		300000	0.4	
SV65-12P-5	11:47	50	37313	5	4	110000	10.03	0.006	110000	1	10.03	110000	10.01	0.01
SV65-12P-5	12:01	2000	929641	3		97844	0.006		110000	10.03		371086	0.01	
VC-N5-1	12:17	200	110000	10.03	10.03	110000	10.007	10.0007	110000	10.03	10.03	350000	0.1	0.1
VC-N5-1	12:35	2000	110000	10.03		110000	10.0007		110000	10.03		3597886	0.1	
VW-4	12:50	200	110000	10.03	10.03	110000	10.007	10.0007	110000	10.03	10.03	25000	0.007	0.007
VW-4	13:05	2000	110000	10.03		110000	10.0007		110000	10.03		238829	0.007	
VW-5	13:21	200	110000	10.03	10.03	110000	10.007	10.007	110000	10.03	10.03	91138	0.03	0.04
VW-5	13:35	200	110000	10.03		110000	10.007		110000	10.03		142696	0.04	
STD	13:49	10	287400	-		703956	-		288387	-		800000	-	
VW-6	14:05	200	110000	10.03	10.03	110000	10.007	10.0007	110000	10.03	10.03	287998	0.09	0.06
VW-6	14:20	2000	110000	10.03		110000	10.0007		110000	10.03		924424	0.03	

RF response factor

Notations: I interference with adjacent peaks

NA not analysed

E estimated peak area

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Checked by

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5.92

6.96

7.68

9.9

standard conc.		CCL 4			TCE			EDB			PCE		
		2		µg/l		10		µg/l		20		5	
response from		area		area		area		area		area		area	
ul injection		area		area		area		area		area		area	
10		area		area		area		area		area		area	
RFs for this sheet		2.27 x 10 ⁻¹⁷		g/area		1.35 x 10 ⁻¹⁶		g/area		9.39 x 10 ⁻¹⁷		3.8 x 10 ⁻¹⁷	
sample	time	amt in l	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l
N ₂ BIK I	08:49	2000	<10000	<0.0001		<10000	<0.0007		<10000	<0.0005		<10000	<0.0002
N ₂ BIK II	09:03	2000	<10000	<0.0001		<10000	<0.0007		<10000	<0.0005		<10000	<0.0002
HR Sample	10:31	2000	65000	0.0007		196467	0.01		<10000	<0.0005		<10000	<0.0002
Syst BIK	10:45	2000	65000	0.0007		194312	0.01		<10000	<0.0005		<10000	<0.0002
SG-64-12P-6	10:59	50	200000	0.09	0.08	10601491	2.9	2.4	<10000	<0.02	<0.02	37312163	2.8
SG-64-12P-6	11:14	50	150000	0.07		7377074	2.0		<10000	<0.02		35000000	2.7
SG-65-12P-5	11:47	50	<10000	<0.005	<0.0001	856075	2	1	<10000	<0.02	<0.0005	1500000	1
SG-65-12P-5	12:01	2000	<10000	<0.0001		12207173	0.8		<10000	<0.0005		28892426	0.5
VC-NS-1	12:17	200	<10000	<0.001	<0.0001	80000	0.05	0.05	<10000	<0.0005	<0.0005	30000	0.006
VC-NS-1	12:35	2000	<10000	<0.0001		779932	0.05		<10000	<0.0005		295130	0.006
VW-4	12:50	200	<10000	<0.001	<0.0001	4000000	3	3	<10000	<0.0005	<0.0005	50000	0.01
VW-4	13:05	2000	<10000	<0.0001		3779188	3		<10000	<0.0005		540835	0.01
VW-5	13:21	200	<10000	<0.001	<0.0001	5267782	4	4	<10000	<0.0005	<0.0005	<10000	<0.0002
VW-5	13:35	200	<10000	<0.001		5264085	4		<10000	<0.0005		<10000	<0.0002
STD	13:49	10	800000	-		1081236	-		1616857	-		100000	-
VW-6	14:05	200	<10000	<0.001	<0.0001	1437691	1	0.7	<10000	<0.0005	<0.0005	<10000	<0.0002
VW-6	14:20	2000	<10000	<0.0001		6391653	0.4		<10000	<0.0005		<10000	<0.0002

Notations: RF
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abramovic

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Job Radian Sacramento Co.

TRACER RESEARCH CORPORATION

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1.26 7.18

		Vinyl chloride				Benzene							
standard conc.		25		µg/l		µg/l		area		µg/l		area	
response from		11527815		area		area		16625738		area		1	
ul injection		21695846		area		area		25696875		area		2	
Vinyl 100		31763850		area		area		35627205		area		3	
Benzene 10		1.50 x 10 ⁻¹⁵		g/area		g/area		8.36 x 10 ⁻¹⁶		g/area		g/area	
RFs for this sheet		area		µg/l		mean		area		µg/l		area	
sample	time	amt in	area	µg/l	area	µg/l	mean	area	µg/l	area	µg/l	area	mean
N ₂ BIK I	08:49	2000	<100000	<0.08				<100000	<0.04				
N ₂ BIK II	09:02	2000	<100000	<0.08				<100000	<0.04				
PIR Sample	09:41	2000	<100000	<0.08				<100000	<0.04				
SYST BIK	10:18	2000	<100000	<0.08				<100000	<0.04				
S ₆ -64-12P-6	10:59	50	4718075	140	130	130	12	<100000	<0.04				
S ₆ -64-12P-6	11:14	50	4034924	120			12	<100000	<0.04				
S ₆ -65-12P-5	11:33	50	3001638	90	54	54	4	250000	4	4			
S ₆ -65-12P-5	12:01	2000	23250821	17			4	10717320	4				
VC-N5-1	12:17	200	<100000	<0.8	10.08	10.08	<0.04	<100000	<0.04	<0.04			
VC-N5-1	12:35	2000	<100000	<0.8			<0.04	<100000	<0.04				
VW-4	12:50	200	<100000	<0.8	<0.08	<0.08	<0.04	<100000	<0.04	<0.04			
VW-4	13:05	2000	<100000	<0.8			<0.04	<100000	<0.04				
VW-5	13:21	200	<100000	<0.8	<0.8	<0.8	<0.4	<100000	<0.4	<0.4			
VW-5	13:35	200	<100000	<0.8			<0.4	<100000	<0.4				
STD	13:49	10	1524634	-			-	3925153	-				
VW-6	14:05	200	<100000	<0.8	<0.08	<0.08	<0.04	<100000	<0.04	<0.04			
VW-6	14:20	2000	<100000	<0.8			<0.04	<100000	<0.04				

RF response factor

Notations: I interference with adjacent peaks

NA not analysed

estimated peak area

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0.32

0.47

1.23

2.22

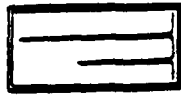
		CO ₂			O ₂			N ₂			C _{H₄}		
standard conc.		µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area	µg/l	area
response from													
ul injection	1000												
		26400	1608525	89600	11845268	739200	15962643	28800	1842514				
			2658513		21704821		25965094		28722602				
			3661660		31684796		35976587		3865405				
RFs for this sheet		4.11 X 10 ⁻¹¹	g/area	5.13 X 10 ⁻¹¹	q/area	1.24 X 10 ⁻¹⁰	µg/l	mean	area	µg/l	mean	area	µg/l
sample	time	amt [n]	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l
H ₂ BIK I	10:34	1000	<100000	<4100		<100000	5100		<100000	<12000		<100000	<3300
H ₂ BIK II	10:37	1000	<100000	<4100		<100000	5100		<100000	<12000		<100000	<3300
RTA Sample	10:40	1000	<100000	<4100		2856383	150000		6231302	770000		<100000	<3300
SYST BIK	10:54	1000	<100000	<4100		2815128	140000		6376833	790000		<100000	<3300
SB-14-12P-6	11:08	1000	567374	23000	22000	918609	47000	56000	5817421	720000	730000	368804	12000
SB-14-12P-6	11:26	1000	542382	22000		1265327	65000		5941592	740000		331775	11000
SB-15-12P-5	11:43	1000	137088	5600	5600	1313556	67000	78000	5578107	690000	700000	972452	33000
SB-15-12P-5	12:11	1000	136272	5600		1731528	89000		5845202	720000		719283	24000
VC-MS-1	12:27	1000	456233	19000	18000	670447	34000	41000	6742185	940000	840000	400000	<3300
VC-MS-1	12:43	1000	432895	18000		934605	48000		6686949	830000		4100000	<3300
VW-4	13:01	1000	92833	4000	3900	2822853	140000	140000	7014920	870000	260000	4100000	<3300
VW-4	13:13	1000	91764	3800		2825459	150000		6920208	860000		4100000	<3300
VW-5	13:31	1000	96811	4000	11000	2726068	140000	140000	6792622	840000	840000	4100000	<3300
VW-5	13:44	1000	262427	11000		2846225	150000		6780319	840000		4100000	<3300
STD	13:57	1000	599382			1570861			5689810			803574	
VW-6	14:16	1000	80192	3300	3400	2628022	130000	140000	6336135	780000	780000	4100000	<3300
VW-6	14:28	1000	81638	3400		2641963	140000		6290355	780000		4100000	<3300

Notations: RF
I
NA
E

response factor
interference with adjacent peaks
not analysed
estimated peak area

Analysed by David Abranovic

Checked by _____



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standard conc. response from ul injection	10	CH ₂ Cl ₂			CH ₂ Cl ₂			12-DCA			TCA		
		200		µg/l	10		µg/l	200		µg/l	5		µg/l
		1	2	area	1	2	area	1	2	area	1	2	area
		3	area		3	area		3	area		3	area	
RFs for this sheet		6.8 X 10 ⁻¹⁵		132 X 10 ⁻¹⁶		6.24 X 10 ⁻¹⁵		5.92 X 10 ⁻¹⁷		g/area		mean	
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	g/area	
VW-9	14:20	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	0.4	
VW-9	14:52	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	0.4	
VW-8	15:10	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	5	
VW-8	15:24	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	6	
VW-7	15:51	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	4	
VW-7	16:05	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	4	
STD	16:18	10	328477	-	-	761027	-	-	287589	-	-	-	
AIR Samp	16:46	2000	<10000	<0.03	<0.007	<10000	<0.007	<0.007	<10000	<0.03	<0.003	<0.0003	

Notations:	RF	response factor
I	I	interference with adjacent peaks
NA	NA	not analysed
E	E	estimated peak area

Analysed by David Abranovic

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Job Radon Sacramento Co

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standard conc.		CCL4				TCE				EDB				PCE			
response from		2		10		10		20		10		10		10		10	
ul injection	10	1	area	µg/l	area	1	area	µg/l	area	1	area	µg/l	area	1	area	µg/l	area
		2	area	µg/l	area	2	area	µg/l	area	2	area	µg/l	area	2	area	µg/l	area
		3	area	µg/l	area	3	area	µg/l	area	3	area	µg/l	area	3	area	µg/l	area
		RFs for this sheet		2.27 x 10 ⁻¹⁷		1.35 x 10 ⁻¹⁶		9.39 x 10 ⁻¹⁷		3.8 x 10 ⁻¹⁷		3.8 x 10 ⁻¹⁷		3.8 x 10 ⁻¹⁷		3.8 x 10 ⁻¹⁷	
sample	time	amt in j	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	area	µg/l	mean	
BW-9	14:20	200	110000	10.001	10.001	759351	0.5	0.6	110000	10.005	10.005	653358	0.1	650000	0.1	0.1	
VW-9	14:52	200	110000	10.001	10.001	907912	0.6	6	110000	10.005	10.005	650000	0.1	650000	0.1	0.1	
VW-8	15:10	200	110000	10.001	10.001	7290190	5	6	110000	10.005	10.005	694639	0.1	694639	0.1	0.2	
VW-8	15:24	200	110000	10.001	10.001	10455486	7	7	110000	10.005	10.005	866975	0.2	866975	0.2	0.2	
VW-7	15:51	200	110000	10.001	10.001	44347058	30	30	110000	10.005	10.005	342264	0.6	342264	0.6	0.6	
VW-7	16:05	200	110000	10.001	10.001	45160857	30	30	110000	10.005	10.005	3766079	0.7	3766079	0.7	0.7	
STD	16:18	10	850000	-	-	1497830	-	-	1845219	-	-	1505640	-	1505640	-	-	
Dis Smp	16:46	2000	110000	10.001	10.001	110000	10.000	10.000	110000	10.000	10.000	110000	10.000	110000	10.000	10.000	
												</					

Notations: RF response factor
I Interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abranovic
Checked by _____

Analysed by David Abranovic

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TRACER RESEARCH CORPORATION

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standard conc.		CO ₂				O ₂				N ₂				C H ₄			
		264 00		µg/l		896 00		µg/l		7392 00		µg/l		288 00		µg/l	
response from		1		area		1		area		1		area		1		area	
ul injection		2		area		2		area		2		area		2		area	
1000		3		area		3		area		3		area		3		area	
RFs for this sheet		4.11 x 10 ⁻¹¹				5.13 x 10 ⁻¹¹				1.24 x 10 ⁻¹⁰				3.35 x 10 ⁻¹¹			
sample	time	amt in	area	µg/l	mean	area	µg/l	mean	g/area	area	µg/l	mean	g/area	area	µg/l	mean	g/area
VW-9	14:46	1000	153122	6300	6200	2280182	120000	120000	860000	7082004	880000	860000	1000000	1000000	8300	8300	1000000
VW-9	15:00	1000	148598	6100		2287123	120000			6879265	850000		1000000	1000000	8300		
VW-8	15:18	1000	177431	7300	7200	1637499	84000	85000	880000	7158350	890000	880000	1000000	1000000	8300	8300	1000000
VW-8	15:32	1000	171980	7100		1670629	86000			7085470	880000		1000000	1000000	8300		
VW-7	16:00	1000	221107	4100	8900	528658	27000	36000	870000	7068026	880000	870000	1000000	1000000	8300	8300	1000000
VW-7	16:14	1000	211051	8700		868463	45000			7148686	860000		1000000	1000000	8300		
STD	16:26	1000	60478	-		1626128	-			5757468	-		802552				
AIR Samp	17:04	1000	100000	14100		1993616	90000	-		6218489	770000		1000000	1000000	8300		
							</										

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abranovic
Checked by _____

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>CALIBRATION PROCEDURES</u>			
Was a fresh standard prepared today?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the standard water analyzed for contamination prior to making standards?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the standard analyzed three times at the start of the day?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the response factor (RF) calculated for each component? (See example field data sheet)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the standard injected after every fifth sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the RF ≤ 20 percent?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A
If not, was corrective action taken?	<input type="checkbox"/>	<input type="checkbox"/>	N/A
<u>DOCUMENTATION</u>			
Is the sample ID written on every chromatogram?	<input type="checkbox"/>	<input type="checkbox"/>	
Was the probe number noted in the log book?	<input type="checkbox"/>	<input type="checkbox"/>	
Can the field data sheets be tracked to the original chromatograms?	<input type="checkbox"/>	<input type="checkbox"/>	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	<input type="checkbox"/>	<input type="checkbox"/>	
Have all of the chemists' calculations been checked by the field technician?	<input type="checkbox"/>	<input type="checkbox"/>	

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>ANALYTICAL AND SYSTEM QC</u>			
Were at least two syringes of each size blanked at the start of the day?	—	—	
Were the ambient air concentrations <.01 ug/l?	✓	—	O ₂ & N ₂ NO
Was pure nitrogen used as the blank gas?	✓	—	
Have the syringes been properly cleaned?	✓	—	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	—	—	WILL DO.
Was a system blank run after every 10 samples?	—	—	
Was the system blank collected concurrent with the ambient air sample?	—	—	
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓	✓ MR	NO
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate analyses)? (Use first perimeter if gas probe is not taken)	✓	—	
Was the relative difference ≤25 percent?	—	—	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	—	—	

Date _____

Initials _____

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FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>SAMPLING OC</u>			
Were all probes cleaned prior to use?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all adaptors cleaned prior to use?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ADDITIONAL COMMENTS

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Date 12.9.87
 Initials MMR
 Page 1 of 3

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

1ST WEEK 0859

Question	YES	NO	Comment
<u>CALIBRATION PROCEDURES</u>			
Was a fresh standard prepared today?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(MR)
Was the standard water analyzed for contamination prior to making standards?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the standard analyzed three times at the start of the day?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the response factor (RF) calculated for each component? (See example field data sheet)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NOT BASED ON PREVIOUS RESPONSES (WILL BE)
Was the standard injected after every fifth sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A
Was the RF ≤ 20 percent?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A
If not, was corrective action taken?	<input type="checkbox"/>	<input type="checkbox"/>	N/A
<u>DOCUMENTATION</u>			
Is the sample ID written on every chromatogram?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the probe number noted in the log book?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Can the field data sheets be tracked to the original chromatograms?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have all of the chemists' calculations been checked by the field technician?	<input type="checkbox"/>	<input type="checkbox"/>	N/A NOT APPLICABLE (NOT AT THIS TIME)

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>ANALYTICAL AND SYSTEM QC</u>			
Were at least two syringes of each size blanked at the start of the day?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A
Were the ambient air concentrations <.01 ug/l?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	EXCEPT CO ₂ O ₂ N ₂
Was pure nitrogen used as the blank gas?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the syringes been properly cleaned?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	NATT
Was a system blank run after every 10 samples?	<input type="checkbox"/>	<input type="checkbox"/>	NATT N/A
Was the system blank collected concurrent with the ambient air sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	NATT
Were system blanks taken at locations away from actual soil-gas sampling locations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	* WILL BE
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate analyses)? (Use first perimeter if gas probe is not taken)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	NATT
Was the relative difference ≤25 percent?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	NATT
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	<input type="checkbox"/>	<input type="checkbox"/>	N/A

Date _____
Initials _____
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FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>SAMPLING QC</u>			
Were all probes cleaned prior to use?	<u>✓</u>	<u> </u>	
Were all adaptors cleaned prior to use?	<u>✓</u>	<u> </u>	

ADDITIONAL COMMENTS

Date 12.5.87
 Initials _____
 Page 1 of 3

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>CALIBRATION PROCEDURES</u>			
Was a fresh standard prepared today?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As discussed checked against prev.
Was the standard water analyzed for contamination prior to making standards?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(yesterday's water)
Was the standard analyzed three times at the start of the day?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the response factor (RF) calculated for each component? (See example field data sheet)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the standard injected after every fifth sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	NATF
Was the RF ≤ 20 percent?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If not, was corrective action taken?	<input type="checkbox"/>	<input type="checkbox"/>	NA
<u>DOCUMENTATION</u>			
Is the sample ID written on every chromatogram?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the probe number noted in the log book?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Can the field data sheets be tracked to the original chromatograms?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have all of the chemists' calculations been checked by the field technician?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NEG. PREL. CALC.

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>ANALYTICAL AND SYSTEM QC</u>			
Were at least two syringes of each size blanked at the start of the day?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were the ambient air concentrations <.01 ug/l?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was pure nitrogen used as the blank gas?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the syringes been properly cleaned?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was a system blank run after every 10 samples?	<input type="checkbox"/>	<input type="checkbox"/>	NA
Was the system blank collected concurrent with the ambient air sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were system blanks taken at locations away from actual soil-gas sampling locations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate analyses)? (Use first perimeter if gas probe is not taken)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the relative difference ≤ 25 percent?	<input type="checkbox"/>	<input type="checkbox"/>	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	<input type="checkbox"/>	<input type="checkbox"/>	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>SAMPLING Q:</u>			
Were all probes cleaned prior to use?	<u> </u>	<u>✓ </u>	PROBES ✓ AS CLEAN BEEN "BRANDED"
Were all adaptors cleaned prior to use?	<u>✓ </u>	<u> </u>	

ADDITIONAL COMMENTS

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

Date 12.7.87
 Initials NAR
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FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>CALIBRATION PROCEDURES</u>			
Was a fresh standard prepared today?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NO IS DISCUSSED PRIOR
Was the standard water analyzed for contamination prior to making standards?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SAME WATER AS BEFORE
Was the standard analyzed three times at the start of the day?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the response factor (RF) calculated for each component? (See example field data sheet)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the standard injected after every fifth sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the RF ≤ 20 percent?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If not, was corrective action taken?	<input type="checkbox"/>	<input type="checkbox"/>	
<u>DOCUMENTATION</u>			
Is the sample ID written on every chromatogram?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the probe number noted in the log book?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Can the field data sheets be tracked to the original chromatograms?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have all of the chemists' calculations been checked by the field technician?	<input type="checkbox"/>	<input type="checkbox"/>	

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>ANALYTICAL AND SYSTEM QC</u>			
Were at least two syringes of each size blanked at the start of the day?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were the ambient air concentrations <.01 ug/l?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was pure nitrogen used as the blank gas?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have the syringes been properly cleaned?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was a system blank run after every 10 samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the system blank collected concurrent with the ambient air sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were system blanks taken at locations away from actual soil-gas sampling locations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate analyses)? (Use first perimeter if gas probe is not taken)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the relative difference ≤ 25 percent?	<input type="checkbox"/>	<input type="checkbox"/>	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	<input type="checkbox"/>	<input type="checkbox"/>	

Date _____
Initials _____
Page 3 of 3

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>SAMPLING QC</u>			
Were all probes cleaned prior to use?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all adaptors cleaned prior to use?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ADDITIONAL COMMENTS

KEN TOLMAN SHOULD DO PPM CALLS

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>CALIBRATION PROCEDURES</u>			
Was a fresh standard prepared today?	<u>—</u>	<u>✓</u>	PREPARED 12-7-87
Was the standard water analyzed for contamination prior to making standards?	<u>✓</u>	<u>—</u>	12-7-87
Was the standard analyzed three times at the start of the day?	<u>✓</u>	<u>—</u>	
Was the response factor (RF) calculated for each component? (See example field data sheet)	<u>✓</u>	<u>—</u>	
Was the standard injected after every fifth sample?	<u>✓</u>	<u>—</u>	
Was the RF ≤ 20 percent?	<u>✓</u>	<u>—</u>	
If not, was corrective action taken?	<u>—</u>	<u>—</u>	
<u>DOCUMENTATION</u>			
Is the sample ID written on every chromatogram?	<u>✓</u>	<u>—</u>	
Was the probe number noted in the log book?	<u>✓</u>	<u>—</u>	
Can the field data sheets be tracked to the original chromatograms?	<u>✓</u>	<u>—</u>	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	<u>✓</u>	<u>—</u>	
Have all of the chemists' calculations been checked by the field technician?	<u>—</u>	<u>✓</u>	

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>ANALYTICAL AND SYSTEM QC</u>			
Were at least two syringes of each size blanked at the start of the day?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were the ambient air concentrations <.01 ug/l?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	390 ug/l
Was pure nitrogen used as the blank gas?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	in ECD
Have the syringes been properly cleaned?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was a system blank run after every 10 samples?	<input type="checkbox"/>	<input type="checkbox"/>	
Was the system blank collected concurrent with the ambient air sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were system blanks taken at locations away from actual soil-gas sampling locations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate analyses)? (Use first perimeter if gas probe is not taken)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Every sample analyzed twice
Was the relative difference ≤ 25 percent?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	<input type="checkbox"/>	<input type="checkbox"/>	

Date 12-9-87
Initials SP
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FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>SAMPLING QC</u>			
Were all probes cleaned prior to use?	<u>✓</u>	<u>—</u>	
Were all adaptors cleaned prior to use?	<u>✓</u>	<u>—</u>	

ADDITIONAL COMMENTS

Duplicate probe taken at SG3069L.
Dup Probe was drilled 1ft away from original

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>CALIBRATION PROCEDURES</u>			
Was a fresh standard prepared today?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the standard water analyzed for contamination prior to making standards?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the standard analyzed three times at the start of the day?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the response factor (RF) calculated for each component? (See example field data sheet)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the standard injected after every fifth sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the RF ≤ 20 percent?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If not, was corrective action taken?	<input type="checkbox"/>	<input type="checkbox"/>	
<u>DOCUMENTATION</u>			
Is the sample ID written on every chromatogram?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was the probe number noted in the log book?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Can the field data sheets be tracked to the original chromatograms?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Have all of the chemists' calculations been checked by the field technician?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>ANALYTICAL AND SYSTEM OC</u>			
Were at least two syringes of each size blanked at the start of the day?	<u>✓</u>	<u>—</u>	
Were the ambient air concentrations <.01 ug/l?	<u>✓</u>	<u>—</u>	
Was pure nitrogen used as the blank gas?	<u>✓</u>	<u>—</u>	
Have the syringes been properly cleaned?	<u>✓</u>	<u>—</u>	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	<u>✓</u>	<u>—</u>	
Was a system blank run after every 10 samples?	<u>✓</u>	<u>—</u>	
Was the system blank collected concurrent with the ambient air sample?	<u>✓</u>	<u>—</u>	
Were system blanks taken at locations away from actual soil-gas sampling locations?	<u>✓</u>	<u>—</u>	
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate analyses)? (Use first perimeter if gas probe is not taken)	<u>✓</u>	<u>—</u>	
Was the relative difference ≤ 25 percent?	<u>✓</u>	<u>—</u>	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	<u>—</u>	<u>—</u>	

Date 12-10-87

Initials DLP

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FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>SAMPLING QC</u>			
Were all probes cleaned prior to use?	<u>✓</u>	<u> </u>	
Were all adaptors cleaned prior to use?	<u>✓</u>	<u> </u>	

ADDITIONAL COMMENTS

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>CALIBRATION PROCEDURES</u>			
Was a fresh standard prepared today?	<u>—</u>	<u>✓</u>	12-10-87
Was the standard water analyzed for contamination prior to making standards?	<u>✓</u>	<u>—</u>	
Was the standard analyzed three times at the start of the day?	<u>✓</u>	<u>—</u>	
Was the response factor (RF) calculated for each component? (See example field data sheet)	<u>✓</u>	<u>—</u>	
Was the standard injected after every fifth sample?	<u>✓</u>	<u>—</u>	
Was the RF ≤ 20 percent?	<u>✓</u>	<u>—</u>	
If not, was corrective action taken?	<u>—</u>	<u>—</u>	
<u>DOCUMENTATION</u>			
Is the sample ID written on every chromatogram?	<u>✓</u>	<u>—</u>	
Was the probe number noted in the log book?	<u>✓</u>	<u>—</u>	
Can the field data sheets be tracked to the original chromatograms?	<u>✓</u>	<u>—</u>	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	<u>✓</u>	<u>—</u>	
Have all of the chemists' calculations been checked by the field technician?	<u>✓</u>	<u>—</u>	

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>ANALYTICAL AND SYSTEM QC</u>			
Were at least two syringes of each size blanked at the start of the day?	<u>✓</u>	<u>—</u>	
Were the ambient air concentrations <.01 ug/l?	<u>—</u>	<u>✓</u>	DETECTION LIMITS VARY
Was pure nitrogen used as the blank gas?	<u>✓</u>	<u>—</u>	
Have the syringes been properly cleaned?	<u>✓</u>	<u>—</u>	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	<u>✓</u>	<u>—</u>	
Was a system blank run after every 10 samples?	<u>✓</u>	<u>—</u>	
Was the system blank collected concurrent with the ambient air sample?	<u>✓</u>	<u>—</u>	
Were system blanks taken at locations away from actual soil-gas sampling locations?	<u>✓</u>	<u>—</u>	
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate analyses)? (Use first perimeter if gas probe is not taken)	<u>✓</u>	<u>—</u>	all twice
Was the relative difference ≤ 25 percent?	<u>✓</u>	<u>—</u>	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	<u>—</u>	<u>—</u>	

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**FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING**

Question	YES	NO	Comment
<u>SAMPLING QC</u>			
Were all probes cleaned prior to use?	<u>✓</u>	—	
Were all adaptors cleaned prior to use?	<u>✓</u>	—	

ADDITIONAL COMMENTS

[illegible]

Date 12-14-87
Initials DP
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FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>CALIBRATION PROCEDURES</u>			
Was a fresh standard prepared today?	—	<input checked="" type="checkbox"/>	(12-10-87) Area counts compared to previous day
Was the standard water analyzed for contamination prior to making standards?	<input checked="" type="checkbox"/>	—	
Was the standard analyzed three times at the start of the day?	<input checked="" type="checkbox"/>	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	<input checked="" type="checkbox"/>	—	
Was the standard injected after every fifth sample?	<input checked="" type="checkbox"/>	—	
Was the RF ≤ 20 percent?	<input checked="" type="checkbox"/>	—	
If not, was corrective action taken?	—	—	
<u>DOCUMENTATION</u>			
Is the sample ID written on every chromatogram?	<input checked="" type="checkbox"/>	—	
Was the probe number noted in the log book?	<input checked="" type="checkbox"/>	—	
Can the field data sheets be tracked to the original chromatograms?	<input checked="" type="checkbox"/>	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	<input checked="" type="checkbox"/>	—	
Have all of the chemists' calculations been checked by the field technician?	—	<input checked="" type="checkbox"/>	

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>ANALYTICAL AND SYSTEM QC</u>			
Were at least two syringes of each size blanked at the start of the day?	<u>✓</u>	<u>—</u>	
Were the ambient air concentrations <.01 ug/l?	<u>✓</u>	<u>—</u>	
Was pure nitrogen used as the blank gas?	<u>✓</u>	<u>—</u>	
Have the syringes been properly cleaned?	<u>✓</u>	<u>—</u>	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	<u>✓</u>	<u>—</u>	
Was a system blank run after every 10 samples?	<u>✓</u>	<u>—</u>	
Was the system blank collected concurrent with the ambient air sample?	<u>✓</u>	<u>—</u>	
Were system blanks taken at locations away from actual soil-gas sampling locations?	<u>✓</u>	<u>—</u>	
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate analyses)? (Use first perimeter if gas probe is not taken)	<u>✓</u>	<u>—</u>	
Was the relative difference ≤ 25 percent?	<u>✓</u>	<u>—</u>	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	<u>—</u>	<u>—</u>	

Date 12-14-57

Initials DLP

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FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>SAMPLING OC</u>			
Were all probes cleaned prior to use?	✓ —	—	
Were all adaptors cleaned prior to use?	✓ —	—	

ADDITIONAL COMMENTS

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>CALIBRATION PROCEDURES</u>			
Was a fresh standard prepared today?	<u>—</u>	<u>✓</u>	area counts checked with previous day 12-10-87
Was the standard water analyzed for contamination prior to making standards?	<u>✓</u>	<u>—</u>	
Was the standard analyzed three times at the start of the day?	<u>✓</u>	<u>—</u>	
Was the response factor (RF) calculated for each component? (See example field data sheet)	<u>✓</u>	<u>—</u>	
Was the standard injected after every fifth sample?	<u>✓</u>	<u>—</u>	
Was the RF ≤ 20 percent?	<u>✓</u>	<u>—</u>	
If not, was corrective action taken?	<u>—</u>	<u>—</u>	
<u>DOCUMENTATION</u>			
Is the sample ID written on every chromatogram?	<u>✓</u>	<u>—</u>	
Was the probe number noted in the log book?	<u>✓</u>	<u>—</u>	
Can the field data sheets be tracked to the original chromatograms?	<u>✓</u>	<u>—</u>	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	<u>✓</u>	<u>—</u>	
Have all of the chemists' calculations been checked by the field technician?	<u>—</u>	<u>✓</u>	

FIELD TECHNICIAN CHECKLIST
 CALDERON INVESTIGATION
 SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>ANALYTICAL AND SYSTEM QC</u>			
Were at least two syringes of each size blanked at the start of the day?	<u>✓</u>	<u>—</u>	
Were the ambient air concentrations <.01 ug/l?	<u>✓</u>	<u>—</u>	
Was pure nitrogen used as the blank gas?	<u>✓</u>	<u>—</u>	
Have the syringes been properly cleaned?	<u>✓</u>	<u>—</u>	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	<u>✓</u>	<u>—</u>	
Was a system blank run after every 10 samples?	<u>✓</u>	<u>—</u>	
Was the system blank collected concurrent with the ambient air sample?	<u>✓</u>	<u>—</u>	
Were system blanks taken at locations away from actual soil-gas sampling locations?	<u>✓</u>	<u>—</u>	
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate analyses)? (Use first perimeter if gas probe is not taken)	<u>✓</u>	<u>—</u>	
Was the relative difference ≤ 25 percent?	<u>✓</u>	<u>—</u>	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	<u>—</u>	<u>—</u>	

Page 3 of 3

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
<u>SAMPLING QC</u>			
Were all probes cleaned prior to use?	<u>✓</u>	<u> </u>	
Were all adaptors cleaned prior to use?	<u>✓</u>	<u> </u>	

ADDITIONAL COMMENTS

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

APPENDIX D

Site Photographs

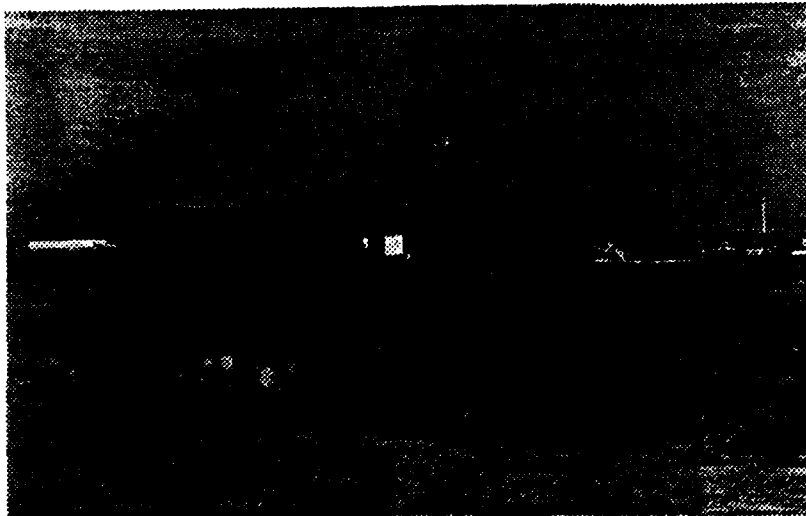


FIGURE 1. Photograph taken at the southern edge of Site No. 7, looking from south to north across the site.

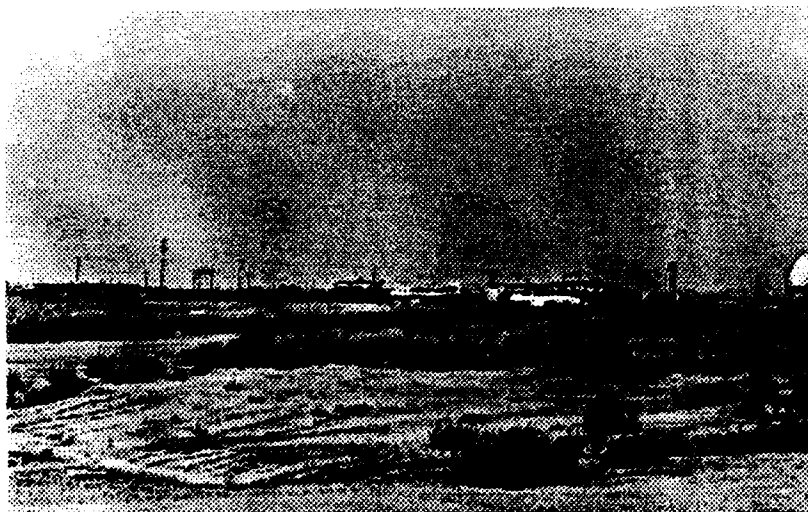


FIGURE 2. Photograph taken west of Sites No. 10, 11, 12 & 13 which are in the background. Photo taken 150 feet west of Building 779, looking from northeast to southwest.

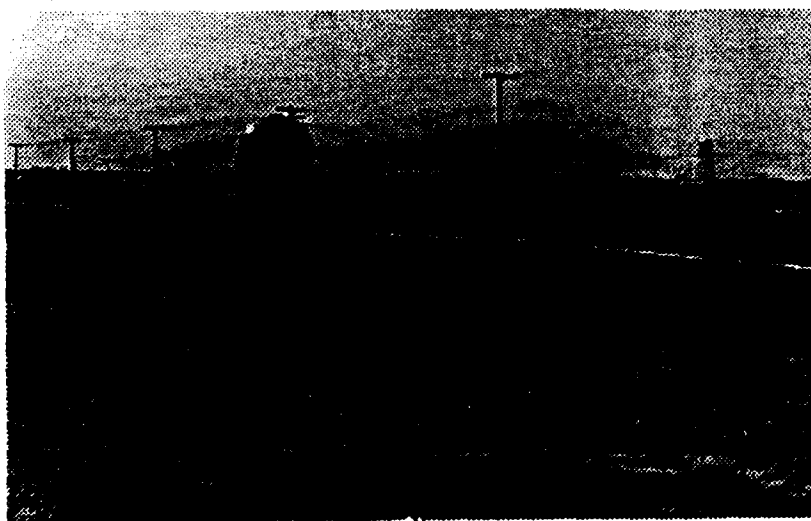


FIGURE 3. Photograph taken on the north side of Site No. 14 looking from northeast to southwest. Patrol Road is in the background.

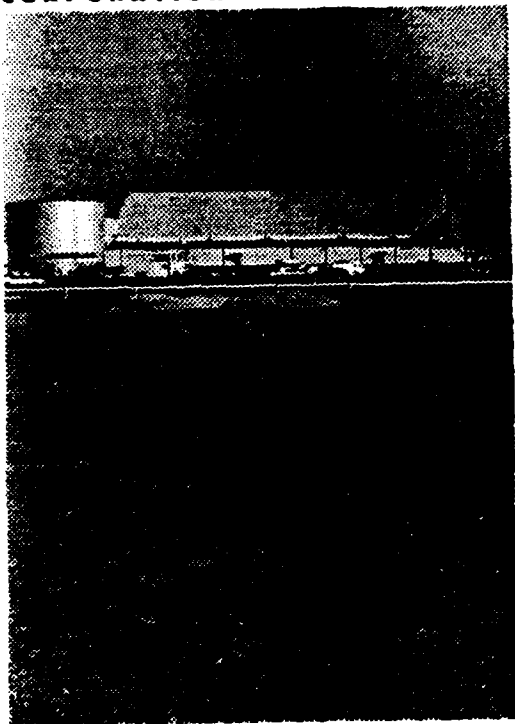


FIGURE 4. Photograph across the middle of Site No. 22 looking from south to north toward Building 704.

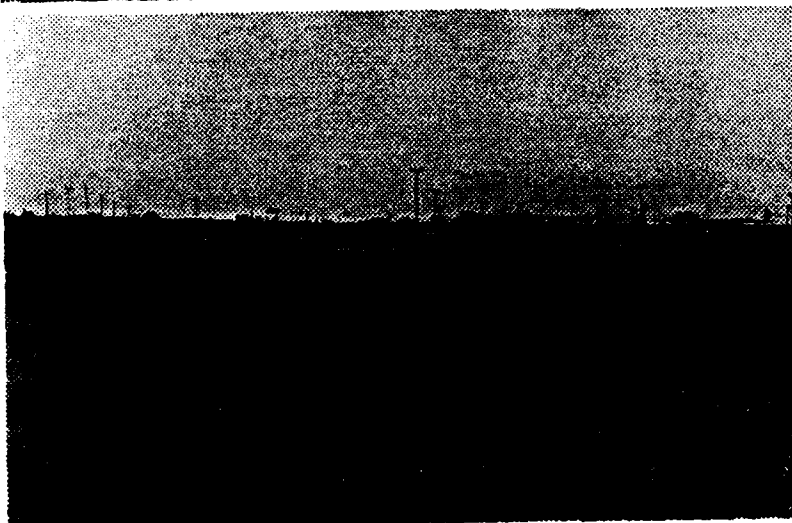


FIGURE 5. Photograph taken on Site No. 24, looking from northeast to southwest toward Building 621.

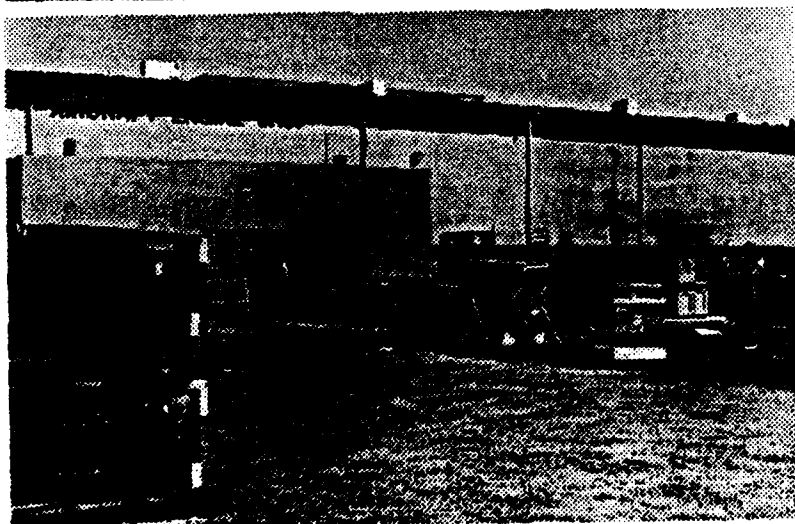


FIGURE 6. Photograph taken at the southern edge of Site No. 38, looking from southwest to northeast toward Building 475.



FIGURE 7. Photograph taken at the southern edge of Site No. 42, looking from south to north across the western tip of the site. Building 704 is at the right in the background.

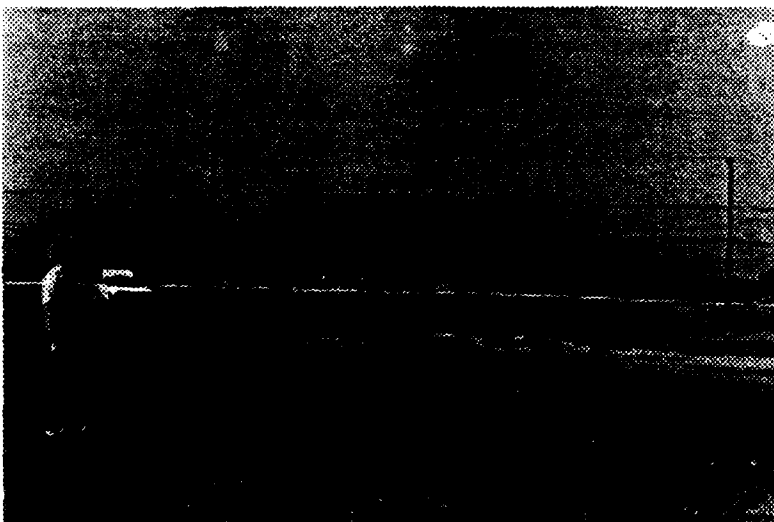


FIGURE 8. Photograph taken at the eastern edge of Site No. 43, looking from east to west toward Patrol Road. The four posts in the center of the picture mark Monitor Well 34S.

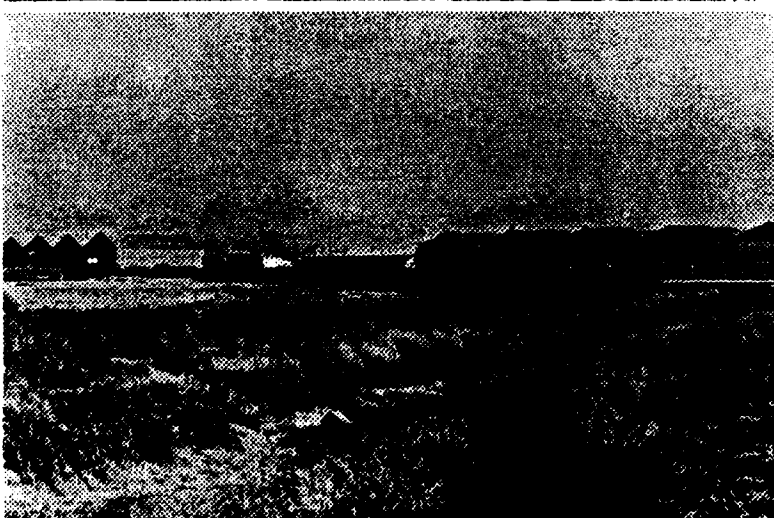


FIGURE 9. Photograph taken at the western edge of Site No. 69, looking from southwest to northeast across the site toward Building 792.

APPENDIX E

Radian Vapor Well Volume
and Vent Cap Calculations

Note: The following calculation sheet presents the calculations used to estimate the volumes of air purged from the vapor well and vent cap sampling points prior to sampling.

GENERAL COMPUTATION SHEET

 CLIENT NAME McClellan AFB
 PROJECT NAME CALDERON SWAT

CALCULATION SET		
Prelim.		
Final		
Sheet	1	Of 2
Charge #		
Rev.	Comp. By	Chk'd By
	Date	Date
	Date	Date

RADIAN VAPOR WELL VOLUME CALCULATIONS

 VOLUME OF A CYLINDER $V = \pi r^2 h$

WHERE

 $h = 3$ FEET

 $r = 1$ INCH OR 0.083 FEET

 $\pi = 3.142$
 1 CUBIC FOOT = 28.32 LITERS

$$VOLUME = 3.142 (0.083)^2 (3)$$

$$= 0.0649 \text{ CUBIC FEET}$$

$$= 1.837 \text{ LITERS}$$

VOLUME OF TUBING TO CAP

 $h = 100$ (MAXIMUM)

 $r = 0.125$ INCHES = 0.01042 FEET

$$V = 3.142 (0.01042)^2 (100)$$

$$V = 0.0341 \text{ CUBIC FEET}$$

$$V = 0.966 \text{ LITERS}$$

GENERAL COMPUTATION SHEET

 CLIENT NAME McCLELLAN AFB
 PROJECT NAME CALDERON SWAT

CALCULATION SET		
Prelim.		
Final		
Sheet <u>2</u> Of <u>2</u>		
Charge #		
Rev.	Comp. By	Chk'd By
	Date	Date
	Date	Date

AREA D VENT CAP VOLUME

$$h = 3 + 2 + 1.5 + 0.5 = 7 \text{ FEET}$$

$$r = 2 \text{ INCHES} = 0.1667 \text{ FEET}$$

$$V = 3.142 (0.1667)^2 (7)$$

$$V = 0.611 \text{ CUBIC FEET}$$

$$V = 17.3 \text{ LITERS}$$

APPENDIX F

Quality Assurance/Quality Control Checklist,
Single-Point and Multi-Point Calibration Curves



INSTRUMENT, DETECTOR AND COLUMN FOR EACH ANALYTE

Two Varian model 3300 gas chromatographs were used for each analysis.

Carbon Dioxide (CO₂), Oxygen (O₂), Nitrogen (N₂) and Methane (CH₄) were all analyzed on an Alltech CTR I column using a Thermal Conductivity Detector (TCD).

Methylene Chloride (CH₂Cl₂), 1,2-Dichloroethane (DCA), Chloroform (CHCl₃), 1,1,1-Trichloroethane (TCA), Carbon Tetrachloride (CCl₄), Trichloroethene (TCE), 1,2-Dibromoethane (EDB) and Tetrachloroethene (PCE) were analyzed on a 6 foot by 0.125 inch stainless steel column packed with 68/80 mesh 0.1% SP-1000 on Carbopac B using an Electron Capture Detector (ECD).

Benzene and Vinyl Chloride were analyzed on the above column using a Photo Ionization Detector (PID) manufactured by Photovac.

MULTIPOINT CALIBRATION DATA

COMPOUND	RELATIVE MASSES/ RESPONSES	CORRELATION (R)
CO ₂	1/364501, 2/698301, 4/1141666	0.994
O ₂	1/490047, 2/814260, 4/1681639	0.997
N ₂	1/3328125, 2/6461679, 4/13086719	0.999
CH ₄	1/462476, 2/973511, 4/1895332	0.999
Benzene	1/2500000*, 1.4/5200000*, 2/10500000*	0.998
EDB	1/537668, 1.4/757249, 2/1163340	0.998
DCA	1/90000*, 1.4/99157, 2/183301	0.949
CH ₂ Cl ₂	1/95000*, 1.4/135306, 2/191218	0.999
PCE	1/524457, 1.4/704770, 2/1096821	0.995
CCl ₄	1/342041, 1.4/547650, 2/866588	0.999
TCA	1/330510, 1.4/437469, 2/654567	0.997
TCE	1/293761, 1.4/441874, 2/651279	0.999
CHCl ₃	1/205175, 1.4/307595, 2/505777	0.998
Vinyl Chloride	1/680000*, 2/1200000*, 4/2119192	0.999

* Estimated peak area